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Railway Age

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EDITORIAL

Railway Age

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The R. A. O. A. Meeting

The *Railway Age* in its issue of last week devoted twelve pages to the annual meeting of the Railway Accounting Officers' Association at Atlantic City, June 8 to 11. The report, as it appeared, was not complete; the remainder of it, therefore, is given in the present issue. The space used, however, was by no means excessive when one considers the calibre of the speakers who were invited to address the meeting; the great amount of ground which the meeting covered; and the multiplicity of the important subjects on which action, favorable or otherwise, was taken. The R.A.O.A. annual meeting discussed committee reports aggregating 500 pages. Two of the important committees each discussed over 70 subjects and their reports each covered over 120 pages. Despite this great weight of material which had to be handled, the meeting was so ably conducted that there was not an uninteresting moment during the entire four days the accounting officers were at Atlantic City, nor was there a single subject that failed to receive as complete discussion as the nature of the subject warranted or as the members present desired. The committee chairman and committee members of the Railway Accounting Officers' Association deserve credit for the amount of work which they have done to make the past year's work a success and for the able manner in which the R.A.O.A. annual meeting was conducted.

Mr. Markham's Significant Letter

The management of the Illinois Central was among the first in the country to foresee the coming of a decline in railroad traffic and to begin preparations for reducing its operating expenses in anticipation of the approaching decline of business. President Markham issued warnings to his officers and employees regarding what was coming while his railroad was still handling the largest business in its history. For this reason a circular letter to officers and employees of the Illinois Central which Mr. Markham issued on June 10 is of unusual interest. He refers to the fact that the decision of the Labor Board in regard to the reduction of wages will result in a substantial reduction of operating expenses. He adds, "You will be interested in learning that we intend to invest that money in maintenance which has been deferred—in the employment of additional men and in the purchase of materials and supplies. We have not waited for the money to come in, but we have already entered upon our program, and we believe that other railways will do likewise. The action of the Labor Board, therefore, operates as the first signal for the opening up of business which will redound to the benefit of the public at large. Crop prospects are favorable. This railway recognizes its pressing duty to patrons to place roadway and equipment in condition to serve them this fall. The Labor Board decision will help to enable it to meet that duty." It is significant that Mr. Markham in his letter refers to the necessity of putting "our affairs in such shape that we will be enabled to grasp the first signs of business revival" to start upon a program of expansion and development. With railway traffic slowly but steadily increasing, with the car surplus slowly but steadily declining, and with more freight cars and other railway facilities needing rehabilitation or enlargement than ever before, it will hardly be necessary for anybody to emphasize to the railway managers the need for entering promptly upon programs of improvement and expansion if regulating bodies and the public will give them opportunity to earn the money necessary to enter upon and carry out such programs.

The Labor Board's Lovefest

The hearings before the Railroad Labor Board on the requests of the various carriers for wage reductions, outlined elsewhere in this issue, ended in a somewhat remarkable manner, considering what had passed before. Instead of the bitter reiteration of charges and counter-charges, which had marked many previous sessions, there were expressions of good-will, sympathy and understanding and pledges of co-operation. This phase of the proceedings was introduced by remarks of F. W. Sargent, general solicitor of the Chicago & North Western, an abstract of which appears elsewhere in this issue. Negotiations between the railways and their employees are in progress throughout the country, and there is contained in Mr. Sargent's remarks and the remarks made by labor leaders in response to them a lesson for both the employers and employees directly engaged in these negotiations. From the standpoint of both the employees and the railways there is great need of the better understanding and co-operation advocated in the concluding session of the Labor Board in the wage hearings. Better understanding and co-operation would mean more efficient operation of the roads, larger net earnings for the companies and higher wages for the employees than they can reasonably hope to retain without them.

A Salesman Without A Price

Speaking of a project in which he was interested but concerning which he was experiencing difficulty in securing data much needed to strengthen his case before the management, a purchasing officer said: "I am in the position of a salesman without a price and you know how much consideration I would give to a salesman who couldn't quote me a price on the goods he was trying to sell." Is this not highly suggestive of the difficulty met by many railway mechanical, engineering and signal officers who complain of inability to secure much needed equipment and facilities? Carrying the figure further, can any salesman expect to inspire confidence in the mind of the prospective purchaser who does not possess a thorough knowledge of his own goods? Do not mechanical officers, for example, who are seeking additional facilities for their shops and engine terminals, frequently fail to meet this essential requirement of salesmanship? There are many psychological problems of salesmanship to which the true salesman devotes much thought and hard work, the solution of which may be beyond the capacity of the busy department head. But he can acquire a knowledge of his project so thorough that he can anticipate and answer intelligently every question likely to arise in the mind of the executive

and until he has this knowledge not only is he almost certainly doomed to failure if he asks for authority to proceed, but he is acquiring a reputation likely to prove a serious handicap on future occasions when executive authority is required. Nothing is likely to do more to paralyze the much needed progress in building up and improving mechanical department and other facilities than attempts to sell nebulous projects to railway executives. The effect of no essential plan for improvement is so intangible that a little critical study will not disclose a means of placing it on a concrete dollars and cents basis.

Signal Lights and Accidents

The alinement of a signal light may play an important part in safe train operation, particularly at places where more than one light is visible at once to the engineman of an approaching train. For example, at an interlocking plant the home signal and train order lights, which may be in close alinement with each other, may have their lamps focused where the maximum beam or most favorable indication is picked up at different points as a train approaches the signals instead of being focused on the same point, which should be the location at which an engineman obtains his first view of the signals. If one signal gives a stronger indication than the others at the point where it is first seen, that indication will naturally be impressed more strongly on the mind of an engineman than those giving a dim indication, particularly on high speed trains. As a consequence there may exist an opportunity for an engineman to misinterpret his indication, causing him to think he has a clear home signal when the light may be from the train order or other signal located close to and in line with the home signal. In the investigation of accidents such as at Porter, the alinement of the lights has been given little consideration, but it is important that every operating officer should know that the most favorable conditions exist at locations where confusion may be caused.

Objections to English Railway Bill

As might be expected of a compromise measure, the British railway bill, which has been advanced to its second reading in the House of Commons, is being severely criticised from all sides. Perhaps the strongest opposition of all is that of the Scottish railway companies. These companies object to the bill because they say it will tend to perpetuate the present wage scales which they believe to be on too high a plane for the railways to bear. Rate increases, they believe, do not afford a remedy for the situation because of the diminished traffic resulting. Compulsory consolidations they hold to be unconstitutional. Mr. Clynes, speaking for labor, opposes the bill because it fails to provide for public ownership and control. Sir F. Banbury of the Railway Companies' Association says of the bill that in order to avoid a temporary catastrophe the railways are being asked to submit to something which will lead to a catastrophe lasting for all time. He proposes as the only solution for the problem the return of the roads to their owners without government interference. Although they fail to grow very enthusiastic about it, apparently many shippers and business men have taken the attitude that the bill offers the only solution of a very complicated situation. Various objections have arisen regarding the amounts to be paid the railways for claims against the government. In some quarters they are said to be insufficient, in others too large. It would perhaps be safe to conjecture, in view of the fact that the objections to the measure are arising from sources whose interests are so varied, that there is little likelihood of any formidable combination on a substitute measure. The very divergence of the criticism, rather than any intrinsic merit in the bill itself, would seem to be its chief source of strength, auguring well for its final passage without substantial change.

Why Not Use More Machines?

One of the most convincing reasons why the railroads, as well as other industries, should give careful study to methods of performing work is contained in the report of the committee of engineers appointed by Secretary Hoover to investigate waste in industry. The report brings out the fact that the production of the country could be increased immediately 50 per cent by the full utilization of existing facilities. The managements of the industries of this country are acknowledged to be the most efficient in the world, and the railroad managements are no exception. It is, therefore, somewhat surprising to find such disparity between present efficiency and the attainable; and it would be even more surprising if this report should not prove to be the incentive for intensive studies to ascertain the best ways of more closely approximating the attainable. So far as the railroads are concerned, one means to the end that immediately suggests itself is an increased use of mechanical handling devices. Many such machines have already proved their value in the various branches of railroad work. By no means, however, have the roads exhausted the possibilities of material handling apparatus in the shops, in speeding up the handling of freight, in saving of time and labor in construction and maintenance and for various other purposes. No one can doubt that further studies in this direction will be well worth while.

Engine Terminal Crane and Trucking Facilities

Continually increasing in size and weight the motion work, machine parts and appliances of locomotives have long since passed the point where they can be economically removed by hand and transported on two-wheel trucks. Locomotive parts have to be renewed frequently in roundhouses, and mechanical devices for handling them should be installed wherever the volume of work warrants. Manual labor will thus be reduced to a minimum and important savings effected. For example, when removing an air compressor in a roundhouse not provided with crane facilities, some sort of make-shift support must be arranged above the compressor to which to attach a chain and falls for lowering the compressor to the floor. Not less than two and sometimes four men are required for this operation which takes considerable time and physical effort and is also more or less dangerous. Overhead electric traveling cranes have been installed in certain engine terminals for handling work of this kind quickly and effectively, but their installation involves practically rebuilding the enginehouse structures. The expense would seldom be warranted except in new terminal developments where it was intended to handle large amounts of heavy running repairs. There is considerable room for improvement in present roundhouses, however, at a relatively small expense, by installing monorail electric hoists, jib cranes and portable cranes. These will accomplish practically the same results at a much smaller cost. Closely allied with the question of proper facilities for removing and applying heavy locomotive parts is the need of efficient means to transport them from the locomotive to the machine shop or department where necessary repairs are made. Important economies can be effected by eliminating as far as possible the use of two-wheel trucks and substituting four-wheel trucks with roller- or ball-bearing wheels of large diameter. In all important roundhouses, electric storage battery or other power-operated trucks and

tractors should be used. To realize the maximum benefit from these material handling devices, the enginehouse floors must be maintained in good condition, hard and smooth, and all passageways kept clear. Arrangements for the prompt and easy handling of material in roundhouses will pay large returns on the comparatively small investment involved.

What Railway Capital and Labor Have Got

THE SPOKESMEN of the railway labor unions will soon appear before the Senate Committee, which is investigating the railway situation, to give their explanation of the fact that the railways are in a serious financial condition. No doubt they will offer the same explanation they offered to the Railroad Labor Board. They have charged before the Labor Board that the troubles of the railways are chiefly due to financial mismanagement. They have alleged that the railways have issued excessive amounts of securities, large parts of which are fictitious because not based on actual investment made in the properties, and have paid interest and dividends on these securities, thus disbursing money which should have been spent for improvements. They have contended that failure of the companies to invest this money in improvements has prevented them from effecting economies in operation, and that this, and not high wages and inefficiency of labor, is the reason why their operating expenses are excessive.

The answer to all these charges is afforded in incontrovertible form by the statistics of the Interstate Commerce Commission. These statistics show just what has been done with all the earnings of the railways each year, and especially what part of them has been paid to Capital as a return upon its investment in the physical facilities, and what part has been paid to Labor for its work. Since Labor claims that Capital has been getting too much, let us compare the amounts Labor and Capital actually have been getting.

The Senate Committee asked for data regarding developments of all kinds on the railways from 1912 to 1920. In 1912 the railways had 1,642,119 employees, to whom they paid approximately $1,210,000,000 in wages, or an average of $737 per employee. In 1919 they had 1,913,422 employees, to whom they paid approximately $2,843,000,000 in wages, or an average of $1,486 per employee. The increase in the average wage per employee was over 100 per cent, and the increase in the total wages paid was $1,634,000,000, or over 135 per cent.

In the year ended on June 30, 1912, the interest paid by the railways on both their funded and unfunded debt was $376,600,000, and the dividends paid on their stock $340,000,000. This made the total amount received by the holders of all their securities $716,600,000. The average amount paid out annually to the owners of all their securities in the years 1913 to 1919, inclusive, was $720,300,000. The total amount of interest paid by them in the year ended December 31, 1919, was $446,800,000, and the total amount of dividends paid by them was $278,500,000, making a total paid to the holders of all their securities in that year of $725,300,000. In other words, between 1912 and 1919 the amount of wages paid to the employees increased $1,634,000,000, or 135 per cent, and the total amount of interest and dividends paid to all the holders of the bonds and stocks increased $8,800,000, or 1.25 per cent. In 1912 railway Capital received 59 per cent as much as railway Labor. In 1919 it received less than 26 per cent as much.

Comparison is made between the statistics of 1912 and 1919, because complete information regarding the interest and dividends paid in 1920 are not yet available. If the data compared were those of 1912 and 1920 the contrast between the increase in the reward received by railway Capital and railway Labor would be much more striking. In 1920 railway Labor received $2,500,000,000 more in wages than in 1912, or over 200 per cent more, while the total interest and dividends paid to railway Capital certainly was not more than in 1919. Therefore, while in 1919 Capital received 59 per cent as much as Labor, in 1920 it did not receive 20 per cent as much.

While the total return paid to railway Capital increased hardly at all between 1912 and 1919, the total investment in property, as shown by the books of the railways, increased from $14,600,000,000 to $18,500,000,000. The interest and dividends paid in 1912 were 5 per cent upon the property investment; in 1919 they averaged 3.9 per cent. The figures given for interest and dividends are not the net operating income earned in the years mentioned, but the actual net amounts paid to the stockholders and bondholders, whether from earnings, government guarantees or from any other source.

When the spokesmen of the labor unions appear before the Senate Committee with their charges regarding the causes of the present financial condition of the railroads, the members of that committee may deem it not inappropriate to ask them some such questions as the following:

How can financial mismanagement of the railroads logically be held responsible for their troubles when in seven years the total interest and dividends paid by them increased only $8,800,000, while in the same seven years the wages paid to railway Labor increased $1,634,000,000 or 185 times as much, and in the eight years from 1912 to 1920, $2,500,000,000, or 285 times as much as the return actually paid to railway Capital?

How can it logically be claimed that railway Capital has been treated, or has treated itself, too well and Labor has been treated unfairly, when the facts show that the average percentage of return upon investment received by Capital declined from 5 per cent in 1912 to about 3.9 per cent in 1919, while the average wage of a railway employee increased from $737 in 1912 to $1,486 in 1919, or over 100 per cent; to $1,820 in 1920, or 147 per cent, and is now running at the rate of $1,926, or over 160 per cent more than in 1912?

The total amount of public service rendered by the railways in 1920 in hauling freight was 55 per cent more than in 1912, and the amount of public service rendered in carrying passengers was 45 per cent more. For its part in rendering this increased service to the public railway Capital received practically no more interest and dividends than in 1912, while railway Labor received 200 per cent more. Wherein do these facts indicate that railway Capital, by dishonest manipulation, etc., "explicited" both the public and the employees, as the labor leaders allege?"

The charge that the present plight of the railroads is due to financial mismanagement is as baseless buncombe as was ever disseminated. They have not all been well managed, financially or otherwise, but they have been brought to the verge of ruin, not by the way they have been managed by the companies that own them, but by the war, by government control, by indefensible and intolerable labor union exactions, and by a policy of regulation which until recently has been amazingly wanting in both intelligence and foresight.

The simple fact that the total interest and dividends paid to the security owners of the railways have stood practically still for ten years while all items of their expenses have been greatly increasing, while the profits made in all other industries have been increasing, while the total production of the country, and, in consequence, the demands made upon the railroads for transportation, have been increasing, is quite sufficient to show why the railways are physically and financially in the condition they now are.

Attitude of the Railways Regarding Rates

THE RAILWAYS of the country recently have sought to make clear their attitude regarding general reductions, and also regarding readjustments of rates. On behalf of the railways Chairman Morris, of the Central Freight Association, on June 8 sent an open letter to shippers of road building and other construction materials who had asked for general reductions of rates to stimulate the movement of their traffic. This letter was quoted in the *Railway Age* of June 10, page 1365, under the heading "Building Material Rates To Stand." It stated that neither present conditions nor reductions in operating expenses which are in immediate prospect will justify any general reductions in rates, but that the carriers are hospitable to suggestions of readjustments which it can be shown are needed, and which will be advantageous to shippers and general business and not unduly disadvantageous to the railways.

Nobody claims that on the present rates the railways are making too much, or even enough, net earnings. Everybody knows that they are not. Substantial reductions in expenses due to declines in the prices of fuel and materials, to reductions of wages and to the abolition of some wasteful rules and working conditions are in sight. With the traffic which has been moving, and the total earnings which the railways have been making thus far in 1921, they would not, however, be able to earn anywhere near a 6 per cent return if they were allowed to retain the benefit of all the reductions in expenses which are actually in prospect. Traffic and total earnings are slowly increasing, but deferred maintenance which has accumulated within recent months is so large that increased earnings due to increased traffic should and will, for months to come, be largely absorbed by increased maintenance expenditures.

It is argued by some that general reductions of rates would cause a large increase in traffic and net earnings, but the relative smallness of the traffic moving is due to general business conditions. The improvement in general business conditions is causing an increase of traffic, and it is very doubtful if the increase would be appreciably accelerated by general reductions of rates. In response to demands from different classes of shippers the railways in several cases already have made general reductions in rates. On April 1 a reduction of approximately 10 per cent in freight rates on lumber was made from the northwest to points east of the Missouri River, but the increase in lumber movement from the northwest since then has been so small as to indicate that the reduction in rates has had almost no effect. The western lines made a reduction in rates on potatoes, but it did not have any appreciable effect. An emergency reduction in live stock rates was equally fruitless. The outcome in each case show that the small business of the shippers was due not to the freight rate, but to want of sufficient demand for their commodities. So long as this condition exists the effect of general reductions in rates would be merely to reduce the earnings of the railways, and not to stimulate traffic.

The ablest and best informed group of industrial traffic experts in the United States are those composing the National Industrial Traffic League. This organization at its recent meeting in Cleveland adopted resolutions strongly deprecating any general reduction of rates and urging that there should be none until the railways are able to make enough net earnings to put them on a sound basis financially and to begin improving and enlarging their facilities.

While it is certain that early general reductions of rates would increase the financial difficulties of the railways and postpone needed rehabilitation of their properties, it is so doubtful whether they would have a good effect on any other class of business that experiments of that kind should be postponed for the present. On the other hand, it is generally recognized that the percentage advances in rates which were made in 1918, and again in 1920, created many unfair discriminations and made many individual rates, and even groups of rates, in different territories and communities excessive. The Interstate Commerce Commission, the railways and the shippers are engaged almost daily in making readjustments to eliminate these inequalities, and the general tendency of these readjustments is to reduce the general level of rates. This process of readjustment should be carried on as rapidly as possible so that the many inequalities will be removed before the time comes when general reductions can be made.

That the time will come when the general reductions can gradually be made, we have no doubt. The total traffic handled, if we may judge by past experience in this country, is sure largely to increase, and large reductions in operating expenses in addition to those in immediate prospect are bound to be made. The result is sure to be large increases in the net earnings of the railways if experiments in general reductions of rates are not made too soon. The Transportation Act not only requires the Interstate Commerce Commission to permit the railways to charge rates which will enable them to earn an average annual return of 5½ to 6 per cent, but the same provisions in effect require the Commission to reduce the rates when the net earnings of the railways are sufficient to justify it.

The general tendency of rates should, and undoubtedly will, be downward in future, but general reductions should follow and not precede the earning of adequate net returns by the railroads. The effect of unduly hurrying the process of reduction would be to further cripple our already seriously crippled transportation system, and would not only delay the time when it could be restored to a satisfactory physical condition, but indefinitely delay permanent improvements in the physical properties which are needed to enable the roads to handle their business with the greatest practicable economy and with the lowest practicable rates.

Number of Railroad Employees Reduced 400,000 in a Year

WHILE THE RAILROADS will continue until July 1 to pay the increased wages awarded by the Railroad Labor Board last year, they are paying them to a much smaller number of employees than they had on their payrolls last year. A compilation just made by the Bureau of Railway Economics from returns from 175 Class I railroads shows a reduction of 14.97 per cent in the number of employees during the first quarter of this year as compared with the first quarter of last year and a reduction of 20.05 per cent for the month of March as compared with March, 1920. As there were 2,009,000 employees in the service of all the Class I roads last March, if the same percentage holds good the total reduction in force during March amounted to about 400,000. For the 175 roads alone it was 379,000 for March and 282,000 for the quarter. For January the reduction was 8.37 per cent and for February of this year it was 14.74 per cent.

There was also a reduction for the three months' period of 22.28 per cent in the number of hours worked by the employees on an hourly basis, and a reduction of 3.59 per cent in the days worked by those reported on a daily basis, but because of the higher wages in effect since May 1 of last year the reduction in the payroll was only 4.93 per cent and the average employee in service received 12 per cent more than for the first quarter of 1920. The total compensation paid to employees for the three months was $717,425,173 for the 175 roads, or $37,000,000 less than they paid for

the corresponding quarter last year before the latest wage increase.

The reduction in the number of employees for the quarter corresponds very closely with the decrease in the volume of freight business, which was about 15 per cent less than for last year. The decrease in passenger travel was somewhat less. The greater reduction in the number of hours than in the number of employees indicates not only that a part of the forces have been put on a short time basis but also a reduction in the amount of overtime work.

The fact that the reduction in force is less than the decrease in the volume of business handled may reflect some increase in efficiency but it probably represents in the main a considerable amount of deferred maintenance, as during the period of dull business the railroads have been forced to delay the repair of cars and locomotives for lack of funds. The bureau's compilation for the 175 roads follows:

Number of employees—	1921	1920	Increase or decrease 1921 over 1920
January	1,734,675	1,893,185	d 8.37
February	1,592,338	1,867,622	d14.74
March	1,509,597	1,888,068	d20.05
Average 1st quarter	1,604,713	1,887,220	d14.97
Total hours worked	858,449,158	1,104,504,381	d22.28
Total days worked	17,142,012	17,780,742	d 3.59
Total compensation	$717,425,173	$754,653,744	d 4.93
Average for quarter	$447	$399	12.

d Decrease

The Board of Economics and Engineering

UNQUESTIONABLY, IT IS a real task which lies before the Board of Economics and Engineering, the creation of which has recently been announced by S. Davies Warfield, president of the National Association of Owners of Railroad Securities. The board in a measure must first justify its existence as a new complication in the already complex railway situation; it has an exceedingly difficult problem to consider, and it is not unlikely that its creation and future procedure may be the subject of criticism in various quarters. The desire behind Mr. Warfield's various efforts, of which this is the latest, to make the security owners more of a power in the railway situation can readily be appreciated. The present position of the security owners is not as favorable as it might be nor as satisfactory as it really must become if railroad securities are to be looked upon with sufficient satisfaction by the investor. However, the *Railway Age* must agree with those who assert that successful operation of our railways is the task of those who are in charge of operating them.

It must reassert its opinions that what the railways and the public need is the opportunity for the railway managers to work out their problems "on their own" and as provided by the Transportation Act. Technically the managers represent the stockholders, but actually they represent the interest of the bondholders, also, for whatever they do to further the real interests of the stockholders is bound to protect and benefit the bondholders, who have a prior claim upon net earnings.

If the Board of Economics and Engineering enters upon its investigation in a purely scientific spirit, and one appreciative of and sympathetic regarding the real difficulties with which railway managements are faced, it can be helpful. If, on the other hand, it allows itself to be dominated by the spirit of intolerance, and antagonism toward and unwillingness to co-operate with the railway managers which has been manifested at times by the association which it represents in the past; and if it enters upon its work with strong preconceptions in favor of the plan of railroad reorganization to which its association recently has committed itself, its efforts will be of very doubtful value. We are impressed by the experience and calibre of the men who compose the new board, but we are frankly dubious as to the amount of good it can accomplish.

New Books

Railway Accounting Officers' Association 1921 Synopsis. Edited by E. R. Woodson, Secretary of the Association. Published by the Railway Accounting Officers' Association, 1116 Woodward Building, Washington, D. C. 6 in. by 9 in.; 400 pages. Bound in cloth.

The R. A. O. A. synopsis which was published in July last year was a book of 228 pages. The 1921 Synopsis contains 400 pages. This expansion in size has not been due to any change of policy which has led the editor to change the style of the book; it represents the additional material developed in the biggest year in the history of the Railway Accounting Officers' Association.

The R. A. O. A. Synopsis is a somewhat unique publication. It is a compilation of the recommendations, mandatory or otherwise, as to standard practices, forms, etc., which have been made and approved from year to year. Because of the multiplicity of the subjects which have been covered and the care that is taken in the association as to the recommendations made, the book is in reality a text book on the subject of railway accounting. It does not attempt to cover the underlying basic principles upon which railway accounting rests, but it does give those details of railway accounting practice which are not available to the student of the subject in any other form. To the accounting officer, the book is an absolute essential. To the ambitious clerk, it should prove equally indispensable for there is no other way in which a student of railway accounting can secure the information as to what are agreed upon as the best methods of carrying out railway accounting work.

The book is divided into four principal sections: Freight, passenger, disbursement and overcharge claims. The recommendations as to over-charge claims have been mandatory in the past; this year the association took the further step of making mandatory also a portion of the freight, passenger and disbursement recommendations. To take care of this situation properly, the editor has arranged each of the freight, passenger and disbursement sections so that in each case the recommendations which have been made mandatory are given first, followed by those which are recommendatory only and concluding with the standard forms. Each section is carefully indexed, so that the book may readily be used for reference purposes. The value of the standard forms is so well realized as hardly to need comment. The number of forms shown is especially noticeable; during the past year the association originated as many new forms, not counting revisions, as in nearly all the previous years' history of the association combined.

There is another feature of the book that should not pass without comment. That is its timeliness. The book naturally could not be published until after the annual meeting had passed on and approved the recommendations resulting from the year's work. The fact that the book is in readiness so soon after the annual meeting is worth more than passing notice.

THE STATE OF TEXAS in 1920 had 4,158 railroad accidents, as compared with 3,351 in 1919, an increase of 807. It was estimated that the damage to track and equipment in 1920 was $1,752,222 and $1,121,353 for 1919. Other figures, as tabulated by the Railroad Commission of the State, showed that 289 persons were killed, compared with 196 in 1919, including four passengers in 1920 and seven passengers in 1919. The total injuries in 1920 were 2,933 and in 1919 they were 2,651.

Letters to the Editor

Do the Railroads Want College Men?

STATE COLLEGE, Pa.

TO THE EDITOR:

Although the college student has had very little to say as to the policy pursued by the railroads in the employment of the college man, he is deeply interested in what the future has in store for him in railroad work. The *Railway Age* has from time to time discussed the problems of the college man and the railroads. Letters on the subject from college professors and railway officials have been published, the faculty claiming that the general attitude of the railroads toward the college man does not induce him to go into railroad work.

On the other hand, letters from railway officials state that the college man does not come up to expectations in most cases and that railroad work requires men of certain temperament and qualifications. One letter in particular stated that the railroads wanted students who had received good grades in their studies and had also taken an active part in athletics and campus activities. From this it appears that the railroads must have the highest grade of material available. In years past it has been commonly understood that if you desired a first class article you had to pay the price.

There are three institutions, of which the writer has some knowledge, that offer special courses to prepare a student for railroad work. They are Purdue University, the University of Illinois and the Pennsylvania State College. These courses and special subjects were added to the curriculum to meet the demand for technically trained railroad men. In comparison with the number who have registered in other courses, few students have availed themselves of the facilities offered to prepare themselves for railroad work. All three of these schools have excellent laboratory equipment and other facilities that usually make a course attractive. With few exceptions, the students who have taken the course in railway mechanical engineering at Penn State have been special apprentices from the New York Central or Pennsylvania railroads. Very few students who are not already affiliated with some railroad register in the railway course.

At the recent convention of the A. R. E. A. there appeared to be considerable discussion on this subject. Some of it was devoted to the kind of a course the student should pursue in preparing for railroad work. Such discussion will be of little value if only a few students take the course. Criticism without something better to offer is worthless. We realize that the railroads are going through a critical period in their history. At the present time the problem of the college student does not amount to much in comparison with the other problems that are to be solved. However, something should be done towards forming a connecting link or liaison between the technical railway student, or the college student who would like to go into railroad work, and his future employer.

Let us consider what the relation is between the student in other courses and his probable future employer; for example, the mechanical engineer. The American Society of Mechanical Engineers has a student branch in which it takes a great deal of interest and goes to considerable pains in seeing that the student members are well informed about the fields of work they are going into. Each week some prominent engineer from some well-known firm or manufacturing concern speaks to the student society on the engineering field that he is engaged in. The students are told of the opportunities in sales engineering, refrigeration, power plants, etc. These different lines of work are made to look very attractive and interesting because quite a number of the speakers come with moving picture films or with stereopticon views. Before the college year is over most of the larger fields of engineering endeavor have been presented to the student in some manner or other, with one exception—he hears nothing or very little about the railroads.

Of course he reads quite a bit about the railroads in the daily press at the present time, but as an appeal to the college student to go into railroad work it is very poor advertising. At the same time, the engineers who come to speak to the student societies get a good line on the most promising of the senior class and if their firms are in need of men they usually get the pick of the lot. During the past three weeks representatives from quite a number of well known manufacturing companies have come to Penn State and have interviewed a large number of the engineering students who will graduate in June. They have already signed up for their respective companies some of the most promising material in the class. Other students whom they thought would be of value to their companies were approached in regard to future employment. The railroads cannot complain, for they make no effort to pick their men, they simply wait for the men to pick the railroad. Possibly this is the reason that the college man who has started to work for the railroad has not always come up to expectations.

For the past eight years the students in railway mechanical engineering at Penn State have supported an organization known as the Motive Power Club. For eight collegiate years they have met once a month to listen to a railroad talk from a member of the faculty or one of the students. Sometimes they have been fortunate in getting some man over from the Altoona shops of the Pennsylvania Railroad or someone from the New York Central. However, this has not happened very often. There has not been a representative of a railroad here this year, and further there is no record of one coming here since 1917. As other concerns come to Penn State year after year for engineers they must be well pleased with men that they are getting. We have gotten reports of similar conditions at both Illinois and Purdue, but the point that the writer wishes to bring out is that the men who have declared their intention of going into railroad work do not receive any encouragement or have any interest shown in them by their future employers. The lack of interest would not be so noticeable if it were not being received by the other student societies. The freshman who has not quite made up his mind as to the engineering course that he intends to pursue cannot help but see that there is a difference.

As a solution the writer would like to offer the following:

1. The appointment of a "student relations" committee from the American Railway Association to see that the student engineer is properly informed of the opportunities in the railroad field; that there is some kind of liaison between the A. R. A. and the student railway societies; that arrangements be made whereby each technical school is provided with at least one speaker a year from the nearest railroad to speak on a purely railway subject.

2. The eventual organization of a student branch of the A. R. A. Such an organization would be composed of students from all courses, such as civil, electrical, industrial and mechanical engineering, who contemplate going into railroad work. It would be similar in composition to the senior organization.

3. Change of policy of the railroads whereby there will be selection of the men whom they believe will be best fitted for railroad service, instead of the present policy of making the man come to the railroad for the job regardless of whether he is the right kind of a man or not.

The writer does not intend to be presumptuous or to take issue with the opinions and judgment of older and more experienced men in railroad work. He merely offers the above as a possible solution of the situation, if the railroads really want the college man.

MARION B. RICHARDSON,
President of the Motive Power Club of The Pennsylvania State College.

Progress of Missouri, Kansas & Texas Since 1913

Marked Improvement in Efficiency of Operation Due to Physical Improvements and Better Methods

Part II

By Samuel O. Dunn
Editor of the *Railway Age*

As THE INCREASE from 299.4 to 504, or 68.3 per cent, in the average tons of freight per train of the Missouri, Kansas & Texas between 1913 and 1920 indicates, there was a great increase in the efficiency of operation of the property between these years.

The increase in service obtained from freight locomotives has been especially great. On June 30, 1913, the Missouri, Kansas & Texas had 395 freight locomotives with a total tractive power of 12,218,545 pounds, or an average per locomotive of 30,933 pounds. On December 31, 1920, it had only 370 freight locomotives, but their total tractive power was 15,225,870 pounds, or an average per locomotive of 41,151 pounds. The average increase in tractive power per locomotive was 42.07 per cent. The increase in the number of tons moved one mile per locomotive (including company freight) was from 5,501,127 in 1913 to 10,211,622 in 1920, or 85.6 per cent.

The railways of the country for many years have been increasing the average tractive power of their locomotives. The increase in the amount of traffic handled with each locomotive has not been in proportion to the increase in average tractive power. In consequence, in the ten years from 1902 to 1913 the number of ton miles of revenue freight service handled *per 1,000 pounds of tractive power* on the railways of the United States declined from 269,000 to 222,000. Since then it has been increasing, and in 1920 it was about 260,000 tons, an advance over 1913 of over 17 per cent. During 1913 the revenue ton mileage *per 1,000 pounds of tractive power* of the locomotives of the Missouri, Kansas & Texas was 151,369; while in 1920 it was 217,587, an increase of 43.8 per cent. The Missouri, Kansas & Texas has a lighter traffic and one consisting of a smaller proportion of bulky commodities adapted to slow freight service than the average American railway, and therefore cannot reasonably be expected to render as many ton-miles of freight service with each locomotive in a given period as the average railway of the country, but the figures show that since 1913 it has increased the ton mileage of freight service rendered two and one-half times as much in proportion to the increase in the tractive power of its locomotives as have the railways of the country as a whole.

An increase in the average freight service rendered with each locomotive may be obtained either by running each locomotive more miles in a given period, or by making each pull more tons in each train, or by both means. As the size, power and complexity of design and construction of locomotives have increased in this country, there has been generally a decline in the average number of miles run annually by each freight locomotive. Undoubtedly this has been largely due to the fact that the number, size, power and complexity of locomotives have been increased faster in proportion than the increase in and improvement of the facilities for turning and maintaining them.

The experience of the Missouri, Kansas & Texas has been much more satisfactory than that of the railways generally. The average miles run by each of its freight locomotives in 1913 was 18,729 and in 1920 it was 20,498, an increase of over 9 per cent.

The average mileage made by its locomotives probably would have shown a still greater increase if it had had better facilities for turning and maintaining them. During most of the last two years it has had an average of about 25 per cent of its engines out of actual service, 10 per cent being in the shops and 15 per cent waiting to get in. The locomotive plants and machinery at locomotive terminals have been inadequate to making needed light running repairs, while the main locomotive repair shops have been inadequate to handling all the heavy repairs needed. This is a condition which the management understands, which it already has made some improvements to remedy, and improvements for more completely remedying which it has projected. Besides the extension of the locomotive shop at Parsons, plans for which already have been mentioned, it is expected to build a small locomotive shop at Waco. Better facilities and machinery for making light running repairs also are to be provided at various locomotive terminals.

The large increase in the traffic handled, both in proportion to the increase in the number of locomotives and in proportion to the increase in their tractive power, has been due mainly to an unusual increase in average tons hauled per train. An increase in average train load may be secured by increasing the number of tons of freight loaded in each car, by increasing the number of cars in each train, or by both means. The increase in car loading obtained depends largely upon the co-operation secured from shippers and regulating authorities. Increase in the number of cars hauled per train depends almost entirely upon improvements in facilities and operating methods. Average tons per loaded car, including company freight, increased from 17.28 in 1913 to 24.35 in 1920, or 40.9 per cent. Average cars per freight train increased from 25.82 to 33.89, or 31.3 per cent.

Statistics of Car Efficiency

The hauling of loaded cars causes operating expense, but also brings in revenue. The hauling of empty cars causes directly nothing but expense and is a patent economic waste when at all avoidable. The Missouri, Kansas & Texas always has had an excessive proportion of empty car mileage, and the figures show that this condition has not been improved. In 1913 its empty car mileage was 31.70 per cent of the total car mileage, and in 1920 it was 37.81 per cent. The average number of empty cars per freight train in 1913 was 8.50, and in 1920, 13.19, an increase of over 55 per cent. This large amount of empty car mileage is partly due to a badly balanced traffic, and partly to special characteristics of the traffic. The northbound and southbound freight on the densest part of the system, that between Denison and Muskogee, are about the same, but there are important parts of the railroad such, for example, as that between Sedalia and Parsons, where the traffic in one direction is as much as 50 per cent greater than in the other.

Furthermore, on some lines commodities are moved in large volume in one direction which cannot be handled in the same kind of cars as commodities moving in large volume in the opposite direction. There is a large livestock movement from Texas to Kansas City and St. Louis, with con-

sequently a long haul of empty cars practically the entire length of the road back to Texas. In 1919, 3.54 per cent of the road's total traffic was livestock—an unusually large proportion. Cars in which coal is moved southbound must be returned empty, as there is practically no lumber or other bulky traffic northbound for which they can be used. The empty car mileage of the Missouri, Kansas & Texas was increased in 1920 by orders from the Car Service Commission which required it to haul large numbers of empties practically the entire length of its line to protect loading in south Texas. The railway is also in an oil producing territory, which makes it necessary to handle large numbers of tank cars for which there is practically no back loading. It is subject to large seasonal movements of cotton and other agricultural products, for a large part of the cars used in which no back loading can be secured.

The large empty car mileage seems irremediable as long as the conditions of production and commerce in the territory of the Missouri, Kansas & Texas remain what they are now. An attempt partially to remedy it has been made by providing 1,587 combination coal and stock cars.

The average miles per freight car per day also seem quite low, having been 21.85 miles in 1913, 24.96 in 1917 and 23.23 in 1920. This low average is partly due to delays to cars at cotton compresses, and to the holding of tank cars for long periods, which is characteristic of territories where oil development is going on. It is also partly due to congestions which occurred as a result of large and practically overnight opening of oil fields on lines which were not in condition to handle the sudden increase of traffic. Another unfavorable influence is the chronic delays to cars loaded with grain, cotton and similar commodities at Galveston awaiting export.

Some light may be thrown on the results which have been obtained by the development and operating policies which have been followed on the Missouri, Kansas & Texas by a few comparisons of its operating units with those of some other railways in the same general territory. The Missouri Pacific, the St. Louis-San Francisco and the Missouri, Kansas and Texas all have lines in the southwest, but the Missouri, Kansas & Texas has a larger part of its mileage in that territory than either of the other roads. The Missouri Pacific, for example, has lines extending as far west as Pueblo, Colorado, while the Frisco has a line running to Birmingham, Alabama. However, all of them are classed as primarily southwestern roads. Furthermore, all have greatly improved their operating results within recent years, and all have been in receivers' hands within recent years, although the receiverships of the Missouri Pacific and St. Louis-San Francisco were not so protracted as that of the Missouri, Kansas & Texas, and therefore the Missouri, Kansas & Texas has had the advantage of having a relatively larger amount of money invested in it which otherwise would have been paid out to the owners of its securities than have the Missouri Pacific and the St. Louis-San Francisco. The average load per car of the Missouri, Kansas & Texas in 1920 was less than that of either of the other roads, but the increase of its average carload between 1913 and 1920 was greater, both in amount and percentage, than that of either of the other roads. Its average train load in 1920 was about 42 tons more than that of the Frisco, and about 121 tons less than that of the Missouri Pacific, but its increase in average train load in seven years was 81.89 per cent, that of the Frisco 41.92 per cent and that of the Missouri Pacific 48.71 per cent. The absolute increase in its number of tons per train also was greater than that of either of the other roads. The management of the Missouri, Kansas & Texas was aided in securing its relatively greater increase in tons per car and per train by the fact that it had a relatively larger increase in total traffic. The revenue ton mileage of the Missouri, Kansas & Texas increased 50.5 per cent, that of the Frisco 24.3 per cent, and that of the Missouri Pacific 44.4 per cent.

The effects produced by the increases in traffic which have occurred, the increases in efficiency of operation which have been obtained, and the advances in rates which were made under government control are indicated by the statistics regarding total revenues from freight and passenger train service which are given in Table 1. These statistics also reflect to some extent the effect of the advances in rates which were made on August 26, 1920, and which, therefore, were in effect during the last four months of 1920.

TABLE 1
FREIGHT AND PASSENGER EARNINGS, YEAR ENDING DECEMBER 31, 1920, COMPARED WITH 1917 AND 1913

	12 Months, 1920	12 Months, 1917	Increase or decrease	Per cent	12 Months 1913	Increase or decrease	Per cent
Freight							
Average mileage operated	3,793.42	3,866.31	72.89*	1.9*	3,816.77	23.35*	0.6*
Freight train revenue	$47,363,850.89	$29,027,903.37	$18,335,947.52	63.2	$20,250,482.88	$27,113,368.01	133.9
Per cent of gross revenue	64.96	66.97	2.01*	3.0*	63.29	1.67	2.6
Freight train revenue per mile of road	12,485.79	7,507.91	4,977.88	66.3	5,305.66	7,180.13	135.3
Freight train revenue per train mile	6.32	4.16	2.16	51.9	2.79	3.53	126.5
Freight train revenue per revenue car mile (cents)	18.11	12.15	5.96	49.1	10.41	7.70	74.0
Freight train revenue per ton	3.55	2.26	1.29	57.1	2.23	1.32	59.2
Freight train revenue per ton per mile (cents)	1.43	.97	.46	47.4	1.09	.34	31.2
Passenger							
Revenue from passengers	$19,378,120.16	$11,160,922.06	$8,217,198.10	73.6	$9,552,480.30	$9,825,639.86	102.9
Per cent of gross revenue	26.58	25.75	.83	3.2	29.85	3.27*	11.0*
Passenger service train revenue	$23,906,941.22	$13,296,529.47	$10,610,411.75	79.8	$11,294,301.85	$12,612,639.37	111.7
Passenger revenue per mile of road	5,108.35	2,886.71	2,221.64	77.0	2,502.77	2,605.58	104.1
Passenger revenue per train mile	2.54	1.46	1.08	74.0	1.19	1.35	113.4
Passenger train revenue per mile of road operated	6,302.21	3,439.08	2,863.13	83.3	2,959.13	3,343.08	113.0
Passenger service train revenue per train mile	3.14	1.74	1.40	80.5	1.41	1.73	122.7
Average revenue from each passenger	2.23	1.65	.58	35.2	1.35	.88	65.2
Average revenue per passenger per mile (cents)	2.94	2.39	.55	23.0	2.30	.64	27.8

*Indicates decrease.

The increase in total freight revenue in 1920 over 1913 was 133.9 per cent. The increase in freight revenue per train mile was from $2.79 to $6.32, or 126.5 per cent. Since the increase in the revenue per ton per mile was only from 1.09 cents to 1.43 cents, or 31.2 per cent, it will be seen that very much the greater part of the increase in the revenue per train mile was due to the increase in the average tons per train. The increase of 135.3 per cent in freight train revenue per mile of railroad, with an increase of only 31.2 per cent in the average revenue per ton per mile, of course reflects chiefly the very large increase made in the amount of traffic moved over each mile of road.

The increase in passenger service train revenue of 111.7 per cent was due only in a small measure to advances in passenger rates, since the average revenue per passenger per mile increased only 27.8 per cent. It was due chiefly to an

increase of 58.5 per cent in the number of passengers carried one mile. This largely increased passenger traffic was handled with 396,514 passenger train miles less than in 1913, a reduction of 4.9 per cent. In consequence of an increase of 66.8 per cent in average passengers per train mile, and of the increase of 27.8 per cent in the average revenue per passenger per mile, the passenger revenue per train mile increased 113.4 per cent.

Table 2 gives total revenues and expenses during the years 1913, 1917 and 1920.

The increase in total earnings in 1920 over 1913 was 127.9 per cent. Unfortunately, the Missouri, Kansas & Texas between 1917 and 1920 suffered from the same enormous increases in operating expenses, unaccompanied by corresponding advances of rates, from which all the railways of the United States suffered. While between 1913 and 1920 its total earnings increased 127.9 per cent, its operating expenses increased almost 193 per cent. Between the years 1917 and 1920 its total earnings increased 68.2 per cent, and its operating expenses 110.8 per cent. In consequence, during 1920 its expenses consumed over 95 per cent of its earnings, and with gross earnings of almost $72,915,000 it had a net operating revenue of only about $3,000,000. But it came out of this period better than most of the railways of the United States, for most of them during this period had no net operating revenue at all.

One measure of the comparative efficiency with which a railway is being operated which often is used, is the ratio of its transportation expenses to its total earnings. Expenditures which are made for maintenance go into the physical property, and therefore a relatively high ratio of maintenance expenses to total earnings, other things being equal, indicates that a property is being well maintained. On the other hand, every dollar which is spent for transportation expenses is gone forever, and therefore the lower is the transportation ratio to total earnings the more favorable are the operating and financial results, other things being equal.

Recent years have been a period of high transportation ratios because operating expenses, and especially transportation expenses, have been increased more than rates. The railways of the southwest usually have had comparatively high transportation ratios, because they usually have suffered from relatively low freight and passenger rates and inadequate earnings.

The table at the top of the page shows the transportation ratios of some railways having large mileages in the southwest in the four months ended December, 1920, and also in the ten months ended December, 1920, as compared with the ten months ended December, 1917.

It will be seen that the Missouri, Kansas & Texas Lines had the lowest transportation ratio of any of the railways mentioned, both in the last four months of 1920, when the present freight and passenger rates were in effect, and also in the last ten months of 1920, during six months of which the advances in rates granted by the Interstate Commerce Commission in August were not in effect. It will also be seen that the transportation ratio of the Missouri, Kansas & Texas increased less between 1917 and 1920 than that of any of the other lines mentioned. Its comparatively low present transportation ratio is due to the improvements in facilities and in operating methods which have been made under the receivership.

	4 Months ended December 1920	10 Mos. ended Dec. 1920 (Federal excluded)	10 Mos. ended December 1917	Increase 10 mos. 1920 over 1917	Per cent of increase 10 mos. 1920 over 1917
M. K. & T. Lines	38.11	41.47	35.53	5.94	16.72
Frisco Lines	39.05	41.82	34.50	7.32	21.22
Kansas City Sou. System	39.75	42.26	31.62	10.64	33.65
Missouri Pacific	42.12	44.43	33.28	11.15	33.50
Rock Island Lines	44.60	46.17	37.08	9.09	24.51

Results of Operation Under Advanced Rates

These improvements put the railway in a good position to benefit by the advances in rates granted by the Interstate Commerce Commission in August, 1920, and statistics regarding its earnings and expenses in the last four months of 1920, following the advances in interstate rates authorized by the Interstate Commerce Commission, make, of course, a much better showing than those for the entire year 1920. They alone afford a real and substantial basis for estimating the financial results which the management of the Missouri, Kansas & Texas really can hope to obtain in future.

It is a difficult and precarious undertaking under present conditions to estimate the net return which any railway can reasonably be expected to earn. There have been greater changes in all the unit costs of operation and in both freight and passenger rates within recent years, and even within recent months, than in many years before. Furthermore, there have occurred, and are still occurring, extraordinarily wide fluctuations of both freight and passenger traffic.

The Missouri, Kansas & Texas has been subject to these changing influences along with other railways. We have entered a period when it is only reasonable to assume that there will be marked reductions in all the unit costs of operation, including especially the principal items, cost of supplies, cost of fuel and cost of labor. If these reductions in costs prove to be large, and if developments show that present freight and passenger rates are so high as to restrict the movement of traffic, we shall probably see in the comparatively near future reductions of rates. No one can foretell how these changes will affect the financial results of the railways as a whole, or of individual railways.

It seems fair to assume, however, that the combined effect

TABLE 2
TOTAL REVENUES AND EXPENSES, YEAR ENDING DECEMBER 31, 1920, COMPARED WITH 1917 AND 1913

Total traffic	12 Months, 1920	12 Months, 1917	Increase or decrease	Per cent	12 Months 1913	Increase or decrease	Per cent
Average mileage operated	3,793.42	3,866.31	72.89*	1.9*	3,816.77	23.35*	0.6*
Gross operating revenue	$72,914,737.06	$43,344,150.39	$29,570,586.67	68.2	$31,998,115.75	$40,916,621.31	127.9
Gross operating revenue per mile of road operated	19,221.37	11,210.75	8,010.64	71.5	8,383.56	10,837.81	129.3
Operating expenses	69,880,878.90	33,146,110.59	36,734,768.31	110.8	23,859,067.66	46,021,811.24	192.9
Operating expenses per mile of road operated	18,421.60	8,573.06	9,848.54	114.9	6,251.12	12,170.48	194.7
Net operating revenue	3,033,858.16	10,198,039.80	7,164,181.64*	70.3*	8,139,048.09	5,105,189.93*	62.7*
Net operating revenue per mile of road operated	799.77	2,637.67	1,837.90*	69.7*	2,132.44	1,332.67*	62.5*
Taxes accrued	2,086,855.03	1,983,114.74	105,740.29	5.3	1,406,748.05	682,106.98	48.5
Taxes per mile of road owned	587.06	549.86	37.20	6.8	395.58	191.48	48.4
Operating income, taxes deducted per mile of road operated	244.50	2,120.65	1,876.15*	88.5*	1,763.87	1,519.37*	86.1*
Ratio of operating expenses to operating revenue	95.84	76.47	19.37	25.3	74.56	21.28	28.5
Transportation ratio (including trans. for inv.—Cr.)	43.87	36.10	7.77	21.5	39.65	4.22	10.6

*Indicates decrease.

of the changes will be to increase rather than to reduce the net return of the railways as a whole. The Interstate Commerce Commission has held that the railways of each large group in the country should be allowed to earn a net return of six per cent upon the valuations fixed by it. On a six per cent annual basis the Class I railways of the country in the months of September, October, November and December, 1920, should have earned a net operating income of $407,815,000. Even the guarantees under government control which were based upon the net operating income earned in the three years ended on June 30, 1917, were in these months for the Class I railways as a whole $342,424,000. The net operating income actually earned by these railways in these months was $233,146,000.

The railways as a whole in the western territory, in which the Missouri, Kansas & Texas is located, fell almost as far short of earning the net operating income expected in these four months as those in other parts of the country. It is fair to assume, therefore, that measures will be adopted which will result in substantially increasing the net earnings, and consequently the operating income, of the railways as a whole, including those in western territory, and that the Missouri, Kansas & Texas will be benefited to some extent at least by these measures.

It is therefore interesting, and seems highly significant, to find that in the last four months of 1920, when the railways as a whole, including those in western territory, showed a great decline of net operating revenue compared with the average earned by them in the same months of the years 1915, 1916 and 1917, the Missouri, Kansas & Texas earned a much larger net operating revenue than it did on the average in the same months of 1915, 1916 and 1917. The net operating revenue earned by it on the average in the last four months of the three years just mentioned was $3,871,807, while its net operating revenue in the months September to December, 1920, inclusive, was $5,375,291. The Missouri, Kansas & Texas on the average in the last four months of 1915, 1916 and 1917, earned 43.4 per cent of its annual average net operating revenue in these years. If we should assume that the net earnings in the last four months of 1920 were 43.4 per cent of what it should earn in a normal year with existing unit costs of operation and existing rates, we should conclude that its net operating revenue for a year would be $12,385,463. Its average net operating revenue in the years 1915, 1916 and 1917 was $8,907,222.

This would indicate a very substantial increase in net operating revenue. When, however, other very important and pertinent factors are taken into consideration, it will appear that this estimate of its probable net operating revenue is too low. Among these factors are the following:

First: The Missouri, Kansas & Texas on the average in the years 1915, 1916 and 1917 carried 36.5 per cent of its freight tonnage in the last four months of the year. In the latter part of the year 1920 it suffered from a decline in traffic, as a result of which in the last four months of the year it handled only 32.5 per cent of its total freight for the year. The tonnage handled by it in the last four months of 1920 was actually smaller than in 1917. If its total tonnage in the last four months of 1920 had been relatively as large as it was in the first eight months of the year it would have handled 837,298 tons more than it did. Its average revenue per ton during these four months was $4.25, and this additional tonnage would have increased its total earnings by $3,558,516. The *additional* cost of handling this *additional* business would not have exceeded one-half of the total revenue derived from it, and therefore this business would have increased the net operating revenue by at least $1,779,000.

Second: A large amount of traffic originating prior to the advance in rates in August was carried at the old interstate rates in these four months. It is estimated that if all its business had been carried at the new rates the total earnings in the four months would have been $225,000 greater. All this would have been added to the net revenues.

Third: Operating revenues as reported for the four months do not include an item of about $100,000 in sleeping car surcharges earned during the period.

The following table indicates how the earnings would have been affected by these differences in traffic and in earnings in the four months September to December, inclusive:

	Actual earnings	Estimated earnings
Total operating revenues	$27,600,379	$31,483.895
Total operating expenses	22,225,088	24,004,088
Net operating revenue	$5,375,291	$7,479,807

In the three years 1915, 1916 and 1917, when there were very few changes in the rates of the Missouri, Kansas & Texas, and when the unit costs of operation were increasing, but not at such an abnormal pace as in recent years, the road in the last four months of each year earned on the average 37.8 per cent of its total annual operating revenues and incurred 36 per cent of its operating expenses. These percentages applied to the "estimated" earnings and expenses for the last four months of 1920 in the above table to get figures for a constructive year under present rates and wages, produce the following results:

Total operating revenues for a year	$83,291,000
Total operating expenses for a year	66,678,000
Net operating revenues	$16,613,000
Operating ratio	80 per cent

Tax accruals and uncollectible revenues, which must be deducted before arriving at total operating income, amounted in the last four months of 1920 to $655,118. This indicates that under present conditions these items will amount in a year to about $2,500,000, which would leave operating income of about $14,100,000 available for rentals, hire of equipment, interest and dividends.

I believe that this is a reasonable and conservative estimate of the net operating income that the railway should earn with a normal traffic under existing unit costs of operation and existing rates. As already stated, the average net operating income earned in the years 1915, 1916 and 1917 was $8,907,222.

There is, however, another important point to be taken into consideration in this connection. The authorities of some states in which the Missouri, Kansas & Texas operates did not make advances in state rates corresponding to those made by the Interstate Commerce Commission in interstate rates. The Interstate Commerce Commission in certain cases already has instructed state authorities to advance state rates to the same basis as those fixed by it. It is estimated that from the traffic handled by it in the months of September to December, 1920, inclusive, the Missouri, Kansas & Texas would have earned $907,300 more than it actually did if the state rates had been advanced. On this basis, its annual earnings would be increased by about $2,400,000 a year by appropriate advances in state rates, and all of this additional revenue would be added to its net revenues. On this basis the road would have total operating revenues in a normal year of $85,691,000, an operating ratio of about 78 per cent, and, after paying its taxes, an amount of about $16,300,000 would be available for rentals, hire of equipment, interest and dividends. This is the most optimistic estimate that can be made now of its operating income under normal conditions: a conservative estimate on the basis of a traffic equal to that of 1920 would be around $14,000,000 available for rentals, hire of equipment, interest and dividends.

Looking to the future, it seems that the principal needs of the Missouri, Kansas & Texas, assuming that it is to be reorganized and taken out of receivership, are the following:

1. A conservative reorganization which will reduce its fixed charges so that they will not be more than $5,000,000

a year, and preferably somewhat less. Every railway is subject to wide fluctuations of traffic and earnings, and high fixed charges make it necessary in every period of light traffic drastically to reduce maintenance expenditures, which injures the property, with resulting higher operating expenses and smaller net earnings in the long run. The foregoing estimates of the Missouri, Kansas & Texas' earning capacity are based on a *normal* year's business. No railway should be required to pay much more than one-third of its normal annual operating income in fixed charges. If, then, in a normal year, it pays another one-third of its operating income out in dividends, it has a reasonably safe margin for declines in earnings in bad years, and for investment in improvements in good years.

2. The Missouri, Kansas & Texas needs a large increase of traffic. With adequate terminals and equipment it could handle a much larger traffic on most of its lines, and a great part of the increased gross earnings would go to net earnings. The road has at present an excessive empty car mileage. Great efforts should be made to stimulate industrial and agricultural development in parts of its territory from which traffic would move in the same directions as the present empty car mileage, and thereby help to load the empties. Every ton of freight loaded in a car that otherwise would move empty is almost so much clear gain.

3. The road needs relief from state legislation which requires it to maintain general offices in three different states —Missouri, Kansas and Texas. It is estimated that the elimination of this duplication of general offices, which is due to unwise state legislation, would save $250,000 in operating expenses annually.

4. It needs a continuance of the development of its physical property along the lines of the present general program, and especially increases and improvements in its yards and in its facilities for repairing and maintaining its locomotives and cars. It also undoubtedly needs a substantial addition to its freight car equipment.

Under a reasonable system of regulation and with able and foreseeing management, such as the railway has had within recent years, it can be made a property which cannot only earn fixed charges of the amount indicated, but also substantial dividends for its stockholders.

Labor Board Considers Wage Reduction Pleas

Hearings Closed with Good-Will and Promises of Co-operation— Decision Expected Soon

HEARINGS before the Railroad Labor Board on the requests of various carriers for wage reductions were closed on June 9 after short rebuttal statements on behalf of both carriers and employees. The requests of the railroads, which were substantially for the entire elimination of the increases granted by the Labor Board last July, are now under consideration by the Board in executive session. The Board has announced that its decision will be handed down before July 1 so that the reductions decided upon will become effective on that date.

The session on June 9 was opened with the testimony of W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen. Mr. Carter, in concluding his remarks requested the Board to rule as to whether the Board's Decision 119 abrogating the national agreements applied to the train service brotherhood's schedules. Mr. Carter stated that many roads have so construed this decision and that the employees will "fight ten times as hard against the abrogation of their schedules as they will against a moderate wage cut." Mr. Carter's stand was backed by the executives of the other brotherhoods. The controversy was finally ended when Dr. C. P. Neill, representing the southeastern railroads, stated that the carriers would agree with the men in their request for a ruling as to the scope and intent of Decision 119.

Among the other representatives of the employees who presented short arguments against wage reductions were G. A. Grubb, secretary-treasurer, National Marine Engineers' Beneficial Association; T. F. Jones, chairman of a committee representing a majority of the clerks on the Nashville, Chattanooga & St. Louis; J. L. Eldridge, Railroad Yardmasters of America; W. B. O'Neill, president, International Association of Railroad Supervisors of Mechanics; P. F. Richardson, president American Federation of Railroad Workers; John Grunau, United Association of Railroad Employees of America; W. L. Heacox, Order of Railroad Station Agents; J. W. Costello, Marine Engineers' Beneficial Association No. 13, Port of Philadelphia; E. P. Groff, Ferry Boat Engineers, Port of Philadelphia; R. C. Bailey, American Association of Engineers, and W. A. Williams, Brotherhood of Dining Car Conductors.

Case Closed with Talk of Better Co-operation

The case was closed with a rebuttal statement by F. W. Sargent, general solicitor of the Chicago & North Western. Mr. Sargent's plea for co-operation between railway employees elicited similar remarks from many of the labor leaders and caused Chairman R. M. Barton to say: "The chairman thinks he can say for the Board that he is delighted to have this hearing close with such good humor on both sides and he would be even more pleased if he could expect to have the decision that is to be handed down by the Board received in the same way."

After admitting certain inaccuracies in an exhibit filed earlier in the hearing and to which his attention had been called, Mr. Sargent said in part:

> I was considerably disappointed after the last hearing at some of the articles appearing in some of the labor journals—glaring headlines to the effect that the railroads treat labor as a commodity, and so on and so forth. I repudiate that statement on behalf of the western carriers. So far as we are concerned, we want to co-operate with our employees in every way we can. I personally want to see them have all the wages that we can possibly pay them that are fair and reasonable. I believe—and you will pardon me for being personal—there is no man in this room that has faced poverty any harder than I have, and I know what it means. I have chopped wood in my lifetime from daylight to dark in order to live, and I have had the gaunt figure of poverty staring me in the face at different times. I have ridden the middle plains of the West from daylight to away into the night, and while I have plowed corn as hard as any living man, I have never limited myself to eight hours, and what I did has never injured me in the least.
>
> I am not making any argument against the eight-hour principle. I am merely saying to these men I can sympathize with them. I want to state to these men who have such great influence with the great masses of railroad labor in the country, that no living man can make a success of his life based on the eight-hour day. If he does not engage himself in some useful occupation and study after his ordinary vocational hours have closed—if he puts in his time in the poolrooms and moving picture theatres—he never can and never will be able

to make a success out of his own life. I want to say—and I would like to drive it home to every young man—that the time is here when we must remember what our forefathers did in our country. Do you think these great railroads would have been built on an eight-hour day? Do you think the pioneers of this country could have developed this country on an eight-hour day? Let us not forget these fundamental principles. Let us work to the end of the eight-hour day, but in doing it let us undertake to inspire the thought and belief in every man that he owes a duty to himself, to his country and to his fellow-man to make use of the other eight hours.

Just in passing I want to say to our good friends on the other side that so far as we are concerned, there is not a locked door in our general offices. We have some marked "Private," but they are not private. The books are open, and I would like to have Mr. Daugherty come and examine them all. There is no class and no distinction on our property, and I want to say that in my judgment the time is here when the employees must get into the harness with us, and we with them, if we are to pull this country out of the horrible depression that it is in to-day. Let us co-operate to that end.

I want to compliment this board in co-operating toward that end. This board is, in a large measure, an experiment. It is the greatest experiment, in my judgment, ever undertaken in any civilized form of government, and I say to you and to these men we want co-operation. As far as our company is concerned, we are going to obey the board's orders in every detail, even if it drives us into bankruptcy, without any qualifications whatsoever. That is our purpose and our spirit, and we want Mr. Carter, Mr. Sheppard, Mr. Daugherty, Mr. Lee and Mr. Jewell to co-operate with us to the end that we may show this property in a condition of progress, and if we do, our employees can share with us in that prosperity. Let us meet across the table and understand one another, and if this board does not do any more than bring about that spirit, it has accomplished the greatest good that could be accomplished for this country.

I cannot refrain from saying, at this time, that I feel that the public of this country ought to understand these matters thoroughly. I am not going to criticize any co-ordinate branch of the government, but I have seen some criticisms in the investigation going on in Washington to the effect that the board has not acted with promptness and there have been some dilatory methods. Speaking for the western carriers, I want to say that we believe this board has acted with the utmost promptness and dispatch and that the country ought to understand that the questions involved in the Transportation Act have made it impossible to act with greater rapidity in this matter.

Employees' Representatives Promise Co-operation

The manner in which Mr. Sargent's plea was received is indicated by the following remarks of some of the labor leaders:

H. P. Daugherty, representing the Brotherhood of Locomotive Engineers, said: "I do not know when I heard anything that pleased me so much as what Mr. Sargent said about co-operation and I want to say to him that we will meet him more than half way and we will go down on the Chicago & North Western if that is the disposition of that railroad and settle these things without coming to the Board."

Mr. Carter said: "Perhaps if that which has been said in the last few minutes could have the same publicity in the public press as the contrary has, public opinion might be different. After all these scraps, as we call them, the closest of friendships between the representatives on both sides have arisen. We may call each other names at times, we may disagree with each other, and if it were not for the 18th amendment we might go out and take a drink together."

B. M. Jewell, president of the Railroad Employees' Department of the American Federation of Labor, said: "I want to say to Mr. Sargent that the organization I represent will accept his invitation. We will help the railroads to make a record and to show other organizations in this country that the way to do business is to co-operate with one another."

Board Hears Pullman Dispute

The dispute over the right of the Pullman Company to bring its request for wage reductions before the Board at this time, the opening phases of which were outlined in the *Railway Age* of June 10 (page 1336), was heard by the Board in an extra session on June 10. The character of the arguments presented at this hearing were similar to those outlined in the *Railway Age* as noted above. Mr. Jewell introduced as a witness, Harry Smith, chairman of the committee representing those Pullman employees who are members of the Railway Employees' Department of the American Federation of Labor. Mr. Smith described the dissatisfaction which he claims exists among the Pullman shop employees as the reason for the strike order which he put out several weeks ago. This order was later revoked by Mr. Jewell. After hearing the arguments on both sides the Board took the case under advisement.

Board Rules in Agreements Controversy

A dispute which had arisen between several of the larger carriers, including the Chicago, Burlington & Quincy, the Chicago & Eastern Illinois and the Texas & Pacific, and their shop employees as to whether an agreement should be made in accordance with the Board's Decision No. 119 with each of the six shop crafts or with the Railway Employees' Department of the American Federation of Labor representing the six crafts was decided by the Board in a decision handed down on June 14. After Decision No. 119 was handed down these carriers and their employees proceeded with the negotiation of agreements as to rules and working conditions. At the outset the question arose as to whether a separate agreement should be made with each of the shop crafts or one agreement which would include the employees, members of the Railway Employees' Department, regardless of the department in which they were employed or the craft in which they worked. The carriers insisted that they had the right to make a separate agreement with each of the crafts or separate agreements with the employees in the maintenance of equipment, maintenance of way and structures and the maintenance of signals and telegraph departments of the various roads.

The decision of the Board in each case is that inasmuch as "the work of the six shop crafts and the conditions under which it is performed are so similar in the main characteristics as to make it practicable and economical to treat said crafts as constituting such an organization or class of employees as is contemplated in the Transportation Act and in Decision No. 119 of the Labor Board, but one agreement should be made for the six shop crafts including employees in other departments.

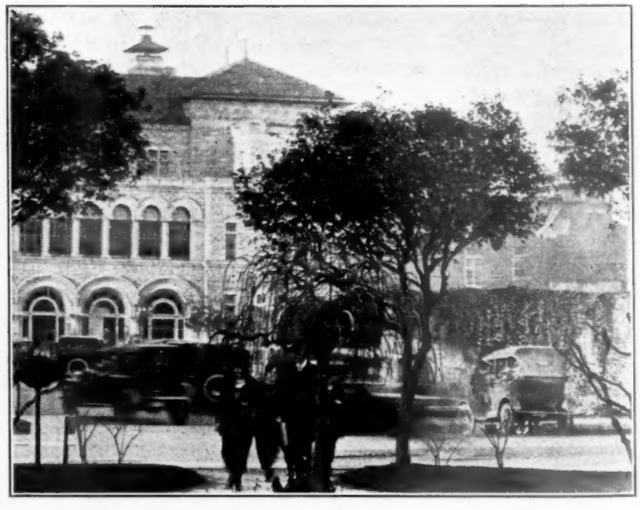


Photo by Ewing Galloway

Southern Pacific Station at San Antonio, Texas

Lift Bridges Compared With Other Movable Forms

An Analysis of Their Relative Advantages and a Detailed Study of the Vertical Moving Types

It is a coincidence that two valuable papers on movable bridge spans, prepared by well known bridge engineers, have been made public almost simultaneously. One of these, a paper by Ernest E. Howard, consulting engineer, Kansas City, Mo., was presented before the American Society of Civil Engineers on May 4, 1921, and comprises a detailed study of the vertical lift bridge. The other is an analysis of the relative economy of movable spans, comprising essentially a comparison of the lift, bascule and swing types by Dr. J. A. L. Waddell, consulting engineer, New York, and will form one of the chapters of his forthcoming treatise on "Economics of Bridge Work." Abstracts of these two papers are presented below. Dr. Waddell's, being more general, is presented first.

The Economics of Movable Spans

By Dr. J. A. L. Waddell
Consulting Engineer, New York

In dealing with the economics of movable spans it will suffice to consider only those types thereof which have survived the test of time, relegating the others to oblivion. The surviving types are the swing, the bascule and the vertical lift; and the first mentioned, as will be shown further on,

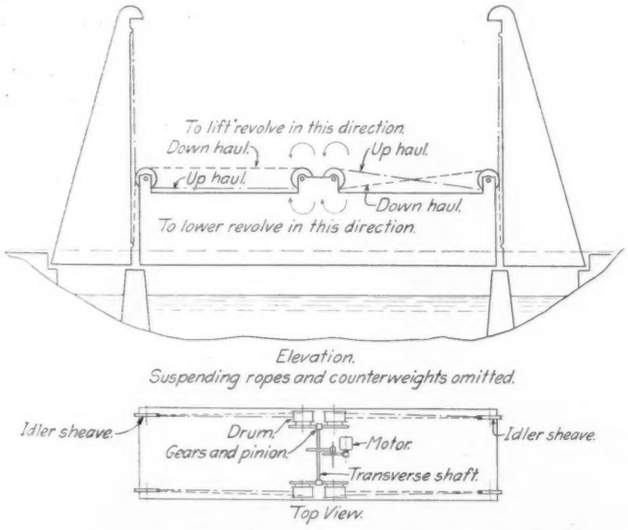


Diagram Showing Typical Arrangement of Operating Machinery and Cables for a Lift Span

has no longer any real *raison d'être*. The choice today, consequently, is between the bascule and the vertical lift, with the preponderance of advantage and economy in most cases favoring the latter.

Before beginning a discussion of the comparative costs of the three surviving types, it will be well to consider thoroughly all their important advantages and disadvantages, excepting only those that relate to first cost of construction, plus capitalized cost of maintenance and repairs.

Swing-Span Versus Either Bascule or Vertical Lift

(1) The swing provides two openings, while either the bascule or the vertical lift affords only one. This is claimed by the advocates of the swing as an advantage; but it is not often such, because very seldom is there a location at which there exists a possibility of the water traffic being so great as to necessitate the simultaneous passage of vessels in opposite directions.

(2) The swing, on account of either its pivot pier or its draw protection, offers much more obstruction to the flow of water than does either of the other types.

(3) The cost of maintenance is more in a swing span than in either of the others on account of the upkeep and periodical replacement of a costly and perishable draw protection.

(4) The swing, of necessity, occupies space outside of that required for the accommodation of land traffic, while the other types do not.

(5) The least practicable time of operation is usually twice or thrice as great for a swing as for a corresponding single-leaf bascule or vertical lift.

(6) Either the vertical lift or the bascule affords better automatic adjustment of the railroad tracks thereon than does the swing span.

(7) In the case of future enlargement of the bridge to accommodate an increase of traffic, the swing has to be torn down and rebuilt, but a vertical lift or a bascule can simply be duplicated alongside.

(8) The danger of the span's being struck, when in motion, by passing vessels is much greater in the case of a swing than in that of either of the other types.

(9) The wider the roadway of a swing the more obstructive does it become to navigation, while the widening of either a vertical lift or a bascule does no harm thereto whatsoever.

(10) In passing vessels with low masts, a swing has to open just as fully as for a high-masted craft, which is not the case with a vertical lift or a bascule.

(11) In sand-bearing streams the protection-works for the moving span of a swing bridge cause a deposit of sediment, and thus often tend to obstruct navigation.

(12) In the case of a shifting channel, the two openings in a swing may score an advantage for that type over the other types, in that vessels might be able to pass through one opening after the other has been silted up; but under such conditions the silting is more than likely to block both openings. Moreover, for such conditions the vertical lift is far superior to the other two types, in that the design of the structure can be made so as to raise at any time any one of several similar spans, simply by shifting thereto the towers, the machinery, and the house or houses.

Vertical-Lift Versus Bascule

Comparing the vertical lift with the bascule, the former has several advantages, amongst which may be mentioned the following:

(1) The floor is always horizontal, permitting the employment of any type of deck that can be used on a fixed span, which is not the case for a bascule. That type of movable span necessitates a timber deck with its consequent fire-risk.

(2) Great wind pressure during operation has no appreciable effect on a vertical lift, while it may cause serious delay to a bascule, or even, under extreme conditions, prevent its operation altogether.

(3) The vertical lift does not have to rise so high for

low-masted passing craft as does the bascule; and thus it saves a considerable amount of time and power.

(4) In railroad bridges when the moving span is down, it acts just like any fixed span, as far as operation under traffic is concerned, which cannot be said for either the swing or the double-leaf bascule.

(5) In case of a shifting channel, it is feasible to make a number of the spans alike and to arrange, for any time in the future and at comparatively moderate expense, to have the towers and machinery taken down, transferred, and re-erected, so as to lift any one of the spans.

(6) The vertical lift, when its towers do not rest on flanking spans, lends itself readily to a further raising or lowering of the grade line in a way that no other type of movable span can possibly do; for all that is necessary is to change the elevation of the bearings of the lift span.

(7) The vertical lift accommodates itself to a skew crossing far better than does the bascule, as in the latter the tail has to be squared, while in the former both the span and the towers may be skewed, thus reducing the clear waterway (and consequently the length of moving span) to a minimum.

(8) By spanning the opening between tops of towers in a vertical lift bridge, electric-wires, water-pipes and gas-pipes can be carried across; but the accomplishment of this in the case of a bascule or a swing would necessitate either expensive and troublesome submarine cables and conduits or special towers for carrying an overhead span.

(9) The inherent simplicity of the vertical lift as a piece of mechanism, compared with the bascule, makes it more reliable in operation, and, on that account, somewhat less expensive.

Types of Swing Spans

The choice between these rim bearing and center bearing swing spans is mainly a matter of taste or sometimes one of prejudice; for there is no great difference in their first costs, what there is being in favor of the latter, which also has a slight advantage in respect to amount of power required to operate. In the author's opinion the principal economic advantage of the center-bearing type is due to the smaller diameter of the pivot pier. There is a difference of opinion among railroad engineers and even among high authorities on bridges concerning both the relative merits and the economics of these two types. A combination of the rim-bearing and the center-bearing swings is advocated by some engineers, but the author, on general principles, objects to hybrid designs, and especially in the case where there must exist a great uncertainty concerning the distribution of load between rim and pivot.

While there is apparently a saving in first cost by cutting down the length of one arm of a swing-span so as to convert it into a "bob-tailed" structure, that saving is generally absorbed by the adoption of more power and heavier machinery (with which to operate against unbalanced wind loads), heavy counterweights, and the special metal needed to support the counterweights.

Economics of Bascule Spans

Bascule spans may be divided into two general classes—single-leaf and double-leaf. The former type is superior to the latter in rigidity, but inferior in appearance, because of lack of symmetry. In the opinion of most railway engineers, on account of the difficulty in properly connecting the outer ends of the two leaves, the double-leaf bascule ought not to be employed for steam-railway bridges, for the reason that the lack of rigidity and the great deflection involved are not compatible with truly first-class construction.

The simplest form of bascule is the ordinary heel-counterbalanced, trunnion type; and this is the kind which is generally adopted when the minimum clearance allowed above water will permit. In many cases the height is not sufficient for the heel of the span and the counterweight to clear the water or the pier-tops, and then the span must be lengthened and a water-tight pit must be provided into which the heel and the counterweight may descend. The expense of construction thus involved is very great; and, consequently, the more complicated and unsightly types, having towers and counterweights above the roadway, are resorted to.

Either of the two primary types of bascule may be divided into three general classes, viz., trunnion, rolling-lift, and roller-bearing. All of these are good, but none is best for all conditions, nor can it be said absolutely that one is always more economical than another.

The rolling-lift is sometimes the cheapest, as has been shown often by competitive bids on different types submitted by contractors; but it is not good practice to adopt it when the pier foundations are of piling, on account of the shifting of the center of gravity of the load on the piles as the span rolls backward and forward, and because of the possibility of pier settlement. The great advantage of this type is its retreating bodily out of the way of passing vessels.

The roller-bearing type has not been much used. When properly designed, it is neat, scientific, and in every essential way excellent, but is not pre-eminently economic.

Economics of Vertical-Lift Spans

The governing conditions which prove economic for the vertical lift, in comparison with the other types of movable spans, are as follows: Low vertical clearance; large horizontal clearance; heavy moving span; existence of fairly-long flanking-spans; deep foundations, especially when the flanking spans are long; expensive piers, when flanking spans are long; skewed crossings; concrete deck desired; other first-class deck, especially if heavy; shifting channel; high wind pressures to be provided for; wide deck; necessity for quick operation.

A low vertical clearance is evidently favorable to the vertical lift. The real factor in this case is the required vertical movement of the lift span. A greater clearance above the water when the span is down favors the vertical lift; since, for any required clear height with the span raised, the vertical movement is reduced.

A large horizontal clearance favors the vertical lift in comparison with the bascule. For a given weight of moving span, the towers, counterweights and machinery of a vertical-lift bridge are independent of the span length, while those items for a bascule vary nearly directly therewith.

Increased weight of span is favorable to the vertical lift. This is chiefly due to the weight of the rear legs and bracing of the towers, which, for a given height thereof, are nearly as heavy for light spans as for heavy ones. For a very light span and high vertical clearance, the weight of the towers may nearly equal that of the span; whereas, for a heavy span and the same vertical clearance, it may be only one-third of the said weight. There is no such variation in the case of the bascule, since the weight of the bracing is a smaller proportion of the total weight of the towers and counterweight trusses.

A layout in which the economic length of the flanking spans is much greater than the proper length of a bascule tower-span favors the vertical lift. In such a case the rear legs of the vertical-lift towers rest on the flanking spans without producing any material stresses therein. But in bascules with overhead counterweights it will be necessary to put in an additional pier, or to carry the weight of the counterweight on one of the flanking spans, or to put the counterweight trunnion over the pier and cantilever the flanking span out to support the trunnions of the moving span.

Deep foundations and expensive piers are favorable to the vertical lift, as compared with the bascule, when long flanking spans are employed; but for crossings over canals or canalized rivers the cost of the substructure usually has little effect

on the comparison. A crossing where the piers rest on piles or sand is especially favorable to the vertical lift, since the total loads for that type are less than those for the bascule. Rolling-lift bascules are not well adapted to such foundations. Deep foundations are usually unfavorable to the swing, on account of the large base of the pivot pier.

Advantage can be taken of a badly-skewed crossing by the vertical lift; for both the span and the towers may be skewed with very little extra expense, while at least one end of the bascule will have to be squared, thus lengthening the span and increasing the cost.

In respect to quickness of operation, this condition does not affect materially the comparative economics of vertical lifts and single-leaf bascules; but both the double-leaf bascule and the swing are at a disadvantage, since they take fully twice as long to operate as do the other types.

The question of flanking spans is of such importance that the author has found it necessary in his practice and in his economic studies to divide the vertical-lift bridge into two distinct types—one where there are fixed spans flanking the movable span, and the other where there are not.

General Elements in the Design of Vertical Lift Bridges

By Ernest E. Howard
Consulting Engineer, Kansas City, Mo.

The principal element of the lift bridge, in its simplest form, is a simple span equipped with machinery for operation, suspended at each end by wire ropes which pass over sheaves on towers and connect to counterweights about equal to the span weight. Variations in almost every feature have developed: Towers may be in part supported on adjacent spans; four vertical columns per tower, with four sheaves, may be used; both towers and span may be square or skewed.

When the lift span is short, the rear bracing of the towers



An Elaboration of the Lift Span Idea. The North Kansas Bridge Over the Missouri River with a Lifting Lower Deck

may be omitted and overhead struts used instead. Where the lift movement is small, each column may be independent, the sheaves placed transverse to the span, and two counterweights hung outside the columns at each end. In one bridge the columns are part of the lift span and extend down as legs into wells in the piers; the sheaves are on the piers and the counterweights are suspended underneath the floor, thus no tower or machinery is above the deck. Towers may be of steel, wood or concrete; concrete towers may be treated architecturally and excellent appearance secured.

Adaptability and Economy

In some alluvial rivers the location of deep-water channels varies through periods of years. Large expenditures occasionally have been made to construct additional movable spans or to maintain a channel under an existing span. This condition may be met by the use of equal spans, as any span can be made to lift and the towers supported on adjacent spans; towers and machinery may be removed from one location and re-erected in another. Similarly, a bridge may first be constructed with fixed spans, and, later, one span may be made movable; also, towers and machinery may be installed and an old fixed span converted into a lift span, thus economically providing for navigation.

Substructures as well as superstructures must be considered in determining comparative economics of movable spans. Tower piers of lift bridges differ little from ordinary piers. The added loads are vertical and do not change in amount or position during span movement, wind excepted. The elaborate protection pier, common with the swing span, is not necessary, and the lift span shows its greatest comparative economy where foundations are deep or expensive, or are carried on piles. For narrow openings where vessels with lofty masts must be accommodated a bascule is preferable; but where the vertical clearance required does not exceed the channel width, the lift span is found to be nearly always cheaper than the swing bridge or bascule, notably for long spans.

Qualities of Wire Rope

The qualities of wire rope are essential features of lift-bridge development. A wire rope composed of steel wires twisted into strands which are twisted about a central rope or strand of wires or oil saturated hemp, is much more elastic than the elements composing it and more flexible than a bundle of the same wires wrapped together straight. Extreme fiber stresses from bends of large radius are very small. Steel of great tensile strength can be used, and no other flexible tension member can approach so small a cross-section with equal strength. Each wire and the finished rope can be tested and an element of marked homogeneity secured of varying characteristics as desired.

The life of a wire rope operating over a sheave is a function of the number of operations. Biggart's experiments with sheaves up to 42 rope diameters developed that the first wire will break approximately at the mid-point of rope life in operations. Applied to sheaves of 60 diameters, his formulas indicate a rope life of about 1,000,000 operations, or for a bridge, say, 50 operations daily up and down for 25 years. Yearly examination of suspending ropes will give timely warning of approaching weakness long before replacement is necessary. With suitable connections such replacement can be made without any interference with traffic or bridge movement.

Forged steel sockets of full rope strength are used to connect ropes to structural parts. The load on a group of ropes of unequal length or uneven stretch may be distributed equally to each by equalizing bars or levers. A clamp on the ropes just below the sheave prevents movements of equalizers due to rope divergence, yet leaves every rope free to equalize.

Suspending Sheaves

Suspending sheaves of 60 to 80 rope diameters afford satisfactory proportions between direct tension and bending stresses in ropes. Grooved sheaves of single steel castings, or of cast rim sections and hub riveted to structural webs are used. Composite sheaves not fully riveted are not satisfactory unless the shop work is better than is ordinarily the case. Sheaves 12 ft. in diameter, 36-in. face, have been supplied as single castings.

The two sheaves on a tower are quite independent, and slight variations in position cause no difficulty provided only that each pair of bearings are in proper relation. The sheaves can be skewed and the suspending ropes led directly from lift-span truss to counterweight, or the sheaves can be

set in any lateral position and the ropes connected to a portal girder of the lift span.

Operating Machinery

The most used and most approved operating machinery comprises operating drums with motor attachment on the lift span controlling operating ropes. Near the middle of the span are four spirally grooved drums connected through trains of gears to motor or engine. Each drum contains and controls two operating ropes which pass, respectively, under and over deflecting sheaves at the corner of the span, thence one upward and one downward to connections on the tower column. Revolution in one direction winds on the up-haul ropes, pays off the down-haul ropes, and lifts the span; reversal of the drums pulls the span down.

The operating ropes connect to take-up devices and may be adjusted to have the same general tension at each corner. The span is thus moved, held level during operation, and may be held at any point or backed down by stopping the machinery. No other locks are necessary, although occasionally used, principally as part of a track-interlocking system.

Methods of constructing counterweights vary with navigation conditions. When there is a closed season the lift span is placed on the piers, the suspending ropes connected and laid over the sheaves, the counterweight frames hung in place, wood forms bolted to them, and the concrete deposited. When the channel must be kept clear, the counterweights can be built in raised position on special beams attached to the towers or other falsework, the lift span floated in, or erected in elevated position, attached to the ropes and lowered to lift the counterweights so their supports may be removed.

Counterweights of pre-cast blocks can be erected with ordinary equipment without falsework, provided only that the channel may be blocked for the few hours needed to raise and place the counterweight parts. They can be taken down as readily, so this form is always used where various spans are made liftable, and is regarded with favor for any bridge.

Except when the span and counterweights are at the same elevation, the suspending ropes are unbalanced. Ordinarily, this varying unbalanced load is handled by the surplus capacity of the operating machinery. Exact balance for all conditions may be secured with counterbalancing chains. Suspending sheaves may be used at the corners of a lift span effecting a three-part rigging of suspending ropes, reducing the counterweights by one-half, and doubling their height of movement. This was found advantageous with a very heavy span with low lift.

The counterweights are guided during movement by jaws engaging vertical tracks on the towers. The span is similarly guided, with allowances for temperature variations of span length, and for the deflections of the towers. At one end the span is held both laterally and longitudinally, at the other only laterally. To bring the span to exact lateral position for proper junction of track rails, the lower few feet of the guide-tracks are battered out to take up all lateral clearance in the guides at the seated position of the span. The guide-jaws may have rollers. Spring guides bearing on tracks on the faces of tower columns have been used, but are less satisfactory than the jaw guides.

The pier at the end of a lifting span supports, in addition to the loads of a fixed span, one tower, sheaves, and ropes, one counterweight, and additional wind load. For a single-track railroad bridge, Class E-55 loading, and lift span 200 ft. long for an ordinary inland river, this total extra load on one pier, except wind, is about 275 tons, which is additional to an ordinary imposed load for the fixed span of about 1,200 tons.

Near together over the Willamette river in Portland, Ore., serving the same kind of traffic, are one steam operated swing span, one electrically operated swing span, one excellent double-leaf bascule span, one double-deck lift span, and one simple lift span. County records show that the latter, the Hawthorne Avenue bridge, serves more tonnage of traffic, operates more quickly, and costs less per operation than any of the others. Its openings average 15 daily, the average time that traffic is delayed per opening is 110 sec., the power consumption is less than 2 kw. per operation, and the cost of power per operation is about 5 cents. The lift span is 245 ft. long.

The lift-bridge idea may be applied not only to lifting spans, but also to a bridge floor supported at several points along its length, called a lifting deck, which is peculiarly adaptable to double-deck structures. In older forms, of



A Further Elaboration of the Vetical Lift Span. The Harriman Bridge at Portland. A Lift Span with a Lower Lifting Deck

which a few small spans have been built, the lifting deck and its counterweights were supported from the overhead trusses. The later structures relieve the supporting trusses of about half this load by placing the counterweights at the ends of the span. The North Kansas City Bridge over the Missouri River has a lifting deck, 425 ft. long, serving a double-track railway.

The Harriman Bridge over the Willamette River at Portland, Ore., offers a noteworthy example of the exceedingly feasible variations possible with the wire-rope lift-bridge idea, for it has a lifting deck suspended under a lifting span which can be operated without movement of the span; or both can be raised at will. This design met the special condition of dense highway traffic on an upper level which is obstructed only a few times a day for the passage of masted vessels, although the lower deck is open sometimes for as many as one hundred boats per day.

A LIQUIDATING CORPORATION whose object will be to round up and take title to all American goods sent to South American countries which have been unclaimed or refused by the consignees is to be formed by a committee which has been named by the Argentine-American Chamber of Commerce. This committee will endeavor to dispose of such unclaimed merchandise and return the proceeds to the owners in this country, thus assisting in the liquidation of a credit which has been frozen solidly for several months.—*New York Times.*

Railroad Hearings Before Senate Committee

Presentation of Railroad Testimony Nearly Completed —Maintenance Expenditures Discussed

WASHINGTON, D. C.

THE HEARINGS on the railroad situation before the Senate committee on interstate commerce were resumed on June 14. E. T. Whiter, chairman of the railroad conference committee which represented the carriers before the Railroad Labor Board, completed his statement regarding the effect of the National Agreements and was followed by L. E. Wettling, manager of the statistical bureau for the Western lines, who presented and explained to the committee a large number of statistical statements prepared by the Bureau of Railway Economics which contain the basic data prepared by the railroads for the hearing, some of which had already been presented in the testimony of individual witnesses. Mr. Wettling was to be followed by W. H. Williams, chairman of the Wabash, and Alfred P. Thom, general counsel of the Association of Railway Executives, was expected to conclude the railroads' presentation this week with a final summing up of the case. The committee has indicated its intention of hearing next from S. Davies Warfield, president of the National Association of Owners of Railroad Securities, who has a plan for the reorganization of the railroads, and later from any shippers who desire to be heard, although the committee has thus far heard from very few representatives of shippers who desire to testify. Representatives of the railroad labor organizations asked that their appearance be postponed until July 5 because of the hearings before the Railroad Labor Board in Chicago and general meetings of labor organizations called for the first part of July to consider the wage decisions.

The necessity for making up for the lack of adequate maintenance during the period of federal control in order to restore the railroads of the country to a condition to meet increased transportation demands was responsible for a large part of the increase in the cost of railroad operations in 1920, Mr. Wettling said.

Chairman Cummins called attention to the fact that this increase in the cost of maintenance was particularly marked during the six months' guaranty period, and, in reply to his question, the witness explained that it was necessary to make extraordinary expenditures for maintenance immediately after the termination of federal control.

Guaranty Does Not Cover Any Excessive Maintenance

"It has been alleged," said Senator Cummins, "that the railroads were reckless during the guaranty period because the government in any event must make good the amount from the federal treasury. I want it to be especially emphasized that the Transportation Act guarded completely against any such contingency as that and if it turns out that the railroads have expended more from March 1 to September 1, 1920, than they ought to have spent according to a formula which was adopted under the standard contract, then the government is not required and will not be required to pay anything because of that fact."

"In other words," interjected Mr. Thom, "the guaranty does not protect the railroads for any excessive expenditure for maintenance."

"One of the controlling factors," said Mr. Wettling, "which tends to distort such comparisons and makes the increase in these expenses in the 1920 period seem disproportionate to the increase in other expenses, lies in the fact that the expenses in the corresponding period in 1919 were subnormal because of restrictions placed upon them by the director general.

"Necessarily such a policy produced a condition of undermaintenance and the roads were turned back on March 1, 1920, in a run-down condition which made it imperative, in the interest of safe and adequate service to the public, that so far as possible the roads be rehabilitated and restored to the condition and efficiency in which they were found when taken over by the government on December 28, 1917.

"This necessity was especially urgent in view of the fact that the public was at that time demanding of the railroads with fair promise of continuance the greatest service in their history, and to perform this task it was essential that the roads be promptly brought to their highest possible point of efficiency, limited only by the ability to obtain the necessary labor and material together with the money with which to pay for the costs.

"The costs were abnormally increased over the corresponding period of 1919 by several well known factors, the principal items being the labor award of July 20. This large increase affected the costs materially during four months of the period under consideration and the cost was also greatly increased, during the entire six months, by reason of the so-called National Agreements, none of which were in effect during the corresponding period of 1919; another large factor entering into the increased cost of maintenance was the increase in prices of material which in May, 1920, were more than 20 per cent greater than in May, 1919, and continued to increase, reaching their maximum in July and August, the average for the year being estimated at about 30 per cent over the average price for 1919.

"The fact that the natural tendency was to limit these maintenance expenses to what were absolute necessities should be evident when consideration is given to section 209 of Transportation Act, 1920, which definitely fixed a limit on the amounts to be allowed for such expenditures and constituted public notice to the carriers that any expenditures in excess of such limits would have to be borne by the carriers themselves.

"Nevertheless, because of the urgent necessities therefore the carriers continued their program of restoration of the properties until in October, 1920, when it became apparent that a general business depression was imminent and that the full net revenues anticipated as a result of the advances granted in Ex Parte 74 were not being realized. Most of the roads had little hope of further advances from the Railroad Administration and because of the refusal of the Secretary of the Treasury to honor certificates of partial payment for the guaranty period the carriers found themselves short of funds and were thus manifestly unable to continue the necessary maintenance expenditures and the expenditures since November, 1920, have suffered a substantial reduction below the necessary requirements by many roads."

Expenditures Necessary to Put Properties in Condition to Handle Traffic

Senator Cummins had called attention to figures shown in an exhibit filed by Mr. Wettling which divided the 1920 figures between the two months' period during which the roads were still under federal control, the six months' guaranty period and the four remaining months of the year after the rate increase. Senator Cummins said that the increase in expenses for maintenance of way and structures during the guaranty period as compared with the corresponding period of 1919 of 45.4 per cent, and in maintenance of

equipment expenditures of 39.2 per cent as compared with increases of only 15.1 per cent and 10.9 per cent, respectively, in the six months ended with February, 1921, arrested attention. Mr. Thom replied that for that reason he desired to call attention to the fact that under the terms of the law the railroads are not protected by the guaranty for the entire amount of the maintenance expenditures during this period, but only to the extent of the amount to be determined by the commission. The railroads made this necessary increase in expenses with their eyes open, he said, because the expenditures had to be made to put the properties in condition to handle the traffic. Senator Cummins said it would be well at that point to read into the record the provision of the transportation act which thus limits the guaranty and directs the commission to apply the rule of the standard contract as to maintenance, saying that he desired to emphasize that point. He added that it is not yet known whether the commission will allow the full amount of the expenditures. Mr. Thom said that it is known, however, that the commission will reduce the amount to be charged for maintenance, for the purpose of fixing the guaranty, to the standard provided for in the act.

In explaining the increase in the amount of money spent by the railroads during 1920 for maintenance purposes compared with the previous year, Mr. Wettling said the railroads performed more maintenance work during the past year than in either 1918 or 1919 when they were under federal control. Although the cost was much greater owing to the increased cost of labor and materials, he said, they performed less, however, in 1920 than they averaged annually during the test period which consists of the fiscal years of 1915, 1916 and 1917. Mr. Wettling said the increase in the amount expended for maintenance purposes in 1920 over 1919 "was not abnormal or excessive."

"In full recognition of the fact," said Mr. Wettling, "that the roads had not been fully maintained to the proper standard during federal operation and that the traffic being offered by the public demanded that the roads be immediately restored to pre-war efficiency in order to render proper and adequate service and notwithstanding the realization that the costs would be excessive because of the trend of prices of material and the probable outcome of the demand for higher wages then before the Labor Board, the roads diligently began their efforts to restore their properties to the high degree of efficiency which obtained prior to the war."

Reports from 93 per cent of the Class I railroads representing approximately 218,000 miles, show that in 1920 they spent $961,304,000 for maintenance of way and structures compared with $727,705,000 in 1919 and $616,742,000 in 1918, while during the test period they averaged $383,699,000.

In 1920, those roads laid 2,262,033 tons of new and second-hand rails the total cost of which was $82,219,999, compared with 2,027,159 tons costing $69,961,049 in 1919 and 1,615,963 tons costing $50,836,964 in 1918. During the test period the yearly average was 2,041,676 while the total cost was $54,166,631.

The ties placed during those years follow:

	Average per annum Test Period	1918	1919	1920
Switch ties (feet)	172,689,571	160,024,789	176,079,389	170,345,383
Bridge ties (feet)	55,625,964	45,400,555	49,644,851	41,533,926
Other ties (number)	83,885,109	69,327,243	73,398,922	77,015,580
Total cost	$58,135,355	$62,886,865	$84,156,035	$107,772,885

Taking up the question of ballast, Mr. Wettling said those roads in 1920 applied 19,118,553 yards at a cost of $12,045,000 or an average cost of 63 cents per yard. In 1919 those roads applied 17,518,791 yards at a cost of $9,481,545 or an average cost of 54 cents, while in 1918 they applied only 14,796,252 at a total cost of $6,472,151 or an average cost of 43 7/10 cents per yard.

Of the total cost of maintenance of way and structures, $577,688,000 or 60.09 per cent was paid to labor. Cost of material was 29.67 per cent. During the test period $209,906,000 or 54.71 per cent went to labor; $401,331,000 or 65 per cent in 1918 and $439,140,000 or 60.35 per cent in 1919.

In connection with the exhibit showing the results of operation since the rate increase, Senator Cummins called attention to the fact that railway revenues in March showed a decrease of two-tenths of one per cent in spite of the increase in rates, showing the effect of the decrease in traffic. Mr. Wettling said there was a reduction for the month as compared with March last year of 27 per cent in ton miles and 13 per cent in passenger miles. The senator also pointed out that the railroads had effected a reduction of $20,000,000, or 4.8 per cent, in the operating expenses for the month and asked if that were not a hopeful sign. Mr. Wettling said that while the railroads were reducing their expenses, the figures showed that about $15,000,000 of the reduction was in maintenance expenditures, which represented largely the postponement of work rather than a real saving. He also called attention to figures compiled by the Bureau of Railway Economics from a questionnaire sent to the railroads, showing that the railroads had actually expended less for labor in the first three months of 1921 than in the corresponding period of 1920 by reductions in force, because the number of employees during the first quarter this year was about 15 per cent less than last year. In connection with the table comparing the operating accounts from 1912 to 1920, Senator Cummins said that the public is being misled by the repeated publication of figures showing the net operating income earned in 1918 and 1919 during the period of federal control, because people were led to believe that the government's loss from the operation of the railroads was only the difference between the amount actually earned and the guaranty to the railroads. If the government had properly maintained the properties, he said, the net operating income would have been smaller and the loss to the government would have appeared larger, and he estimated that the government's loss after allowing for undermaintenance claims would be at least a billion and a half instead of seven hundred, eight hundred or nine hundred million dollars.

"The public will never comprehend what government control cost," he said, "until we have to make an appropriation to pay the final bill."

National Agreements

Mr. Whiter had been questioned by members of the committee as to who was responsible for the rules of the national agreement for shop men. Quoting from the testimony of Frank McManamy, formerly assistant director of the Division of Operation, Railroad Administration, before the Railroad Labor Board on April 11, Mr. Whiter said the committee which actually negotiated this agreement was composed entirely of men of union labor affiliation, at the time employed by the Railroad Administration, after two distinct groups of representatives of the men and of the Railroad Administration had failed to agree on a set of rules. The final negotiation of the agreement, he said, "really amounted to a session of labor representatives sitting down with former confreres and working out a schedule satisfactory to themselves, but in large part wholly unsatisfactory to the railroad officers who represented the government and who had previously disagreed upon about half of the rules suggested."

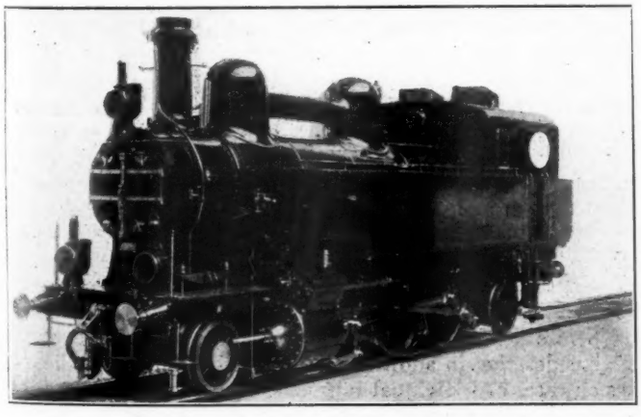
"I have read in the newspapers," Mr. Whiter said, "some criticism of the Labor Board as to the long delay in hearing and disposing of the question of continuing the national agreements, rules and working conditions. The Labor Board had before it the demands of some 20 or more organizations for consideration in addition to the short line hearings, hearings on cases of individual railroads, and other routine work, so that when the magnitude and scope of the question is taken

into consideration in my judgment all things considered the Board has handled their work promptly.

"Decision No. 119, dated April 14, 1921, issued by the United States Railroad Labor Board, directs that Decision No. 2, extending the rules, working conditions and agreements in force under the authority of the United States Railroad Administration, will cease and terminate July 1, 1921, and calls upon the individual railroads and their employees to negotiate new schedules of rules covering working conditions. The Labor Board lays down 16 principles which are to be taken into consideration in the formation of the new rules. If the organizations meet the individual managements in the spirit intended by Decision No. 119 much will be accomplished; if on the other hand the organizations maintain the position contending for that which in effect would be a continuation of the national agreements, thus ignoring the principles laid down in Decision No. 119, little or no progress will be made. Therefore, it remains to be seen whether the roads will be successful in negotiating reasonable and proper rules, or whether the whole question will again be thrown back to the Labor Board for decisions as to what constitutes reasonable rules. If the latter becomes necessary it is obvious that the railroads will not promptly realize the relief from these ultra-restrictive rules, which they believe Decision No. 119 intended."

Mr. Whiter said he had received information that the federated shop crafts intend to remain firm for the principles if not the exact language of the national agreements and that he had just received a pamphlet issued to the members of the federation reporting the results of the negotiations up to date on 85 railroads, which he said plainly indicated the purpose and intention of the federated crafts to hold out without any qualification for the principles of the national agreement. If that is to be their attitude, he said, it is going to be impossible to reach any satisfactory agreement and the whole matter will go back to the labor board for consideration and decision. The crafts will refuse to consent to any agreement unless the railroads agree to accept the principles of the national agreement, which would mean the continuance of the burden of at least $300,000,000 a year, which the railroads ought to be relieved of. Mr. Whiter said that a large number of the railroads have entered into negotiations for new rules to take the place of the national agreement, but that very little progress is being made because of this attitude of the organizations.

Senator Cummins announced that the railroads would be expected to complete their presentation by Friday, June 17, and that Mr. Warfield would be heard beginning on June 21. Clifford Thorne and S. H. Cowan have arranged for an appearance on July 11. Only three or four Senators attended the hearing on Tuesday and Senator Cummins alone represented the committee on Wednesday.



An Austrian Suburban Locomotive

Committee Reports of Purchases and Stores Section

AN ACCOUNT of the business meeting of the Purchases and Stores Division of the American Railway Association, held on June 9-11 at the Blackstone Hotel, was published in the *Railway Age* issue of June 10, page 1355. Owing to lack of space, the reports of the Committees on Buildings and Structures, Scrap Classification and Cross Ties were not included and abstracts are therefore given below.

Buildings and Structures

The committee (J. E. Byron, Gen. Storekeeper, Boston & Maine, chairman) stated that few questions had been referred to it during the year, but that it thought it desirable to emphasize certain points referred to in previous reports.

Construction and Insurance—Lest any impression prevail that "steel unprotected" is not damageable by fire, the use of unprotected metal as structural material, particularly in carrying weights, is even less desirable than substantial timber and plank construction, being more susceptible to fire damage, losing its strength quickly when heated, involving extra expense in removing debris from ruins of such construction, and under schedule insurance the rate on storehouses constructed of wood or unprotected metal is about 50 per cent greater than where other materials are used.

The aggregation of value represented by the contents of a storehouse would alone justify protection against fire regardless of any insurance consideration. But seldom does insurance carried completely cover heavy loss, generally leaving a balance which is irrecoverable, and, what many times exceeds the direct loss, a consequential loss, which includes, among other items, expense of temporary quarters, increased cost of new facilities or in replacing stock, delays to or loss of labor and equipment through lack of proper material and high cost of recovering salvage, necessitating the most careful consideration of fire hazards and their protection.

With regard to rates, nearly all railroad storehouses are insured under schedule policies carried by the road on its property in general, and as the scheme of rating and renewing such general schedules is one of broad classification of risks and fluctuations according to the loss record of each road, it is not possible to estimate the probable rates for any particular type of construction or protection.

Fire Protection—Among other protective measures the subdivision of storehouses by substantial partition walls at reasonable distances to help confine fire to the section in which it starts is most important, and automatic sprinklers are recommended as the best device available, the installation to be planned by experts.

Fire protection appliances and safeguards should be provided only after consultation with fire prevention department of the road, or, if none, with other competent authority, as to what types and locations are suitable, etc. As some appliances on the market are not approved, the standards developed along these lines in recent years by men of wide experience, such as the Railway Fire Protection Association, should be carefully adhered to.

Fires in oil houses or similar hazards are of such nature as to require special precautions, and their prevention should be the subject of reference to the fire prevention department, or such other competent authority as the Railway Fire Protection Association.

Standards—The more this subject is investigated, the more is realized the entire lack of standards covering buildings, shelving, counters, racks, containers, etc. A careful study of this subject by each road is again recommended, and the adoption of standard prints covering the various types of buildings, as well as of standard facilities to be used therein or in connection with such buildings.

Attention is again called to the tremendous need of suit-

able structures in which to house materials to prevent loss and deterioration from exposure to the elements. While this has been followed carefully on some roads, we feel that on many roads it has not been given the attention it deserves.

Location—While every report dwells upon the importance of locating material storage buildings where they will be most convenient to the operations to be served there still exists a tendency to place such buildings without regard to their accessibility, and the saving in labor and time which due consideration of this feature involves.

The committee had planned to work with sub-committee of Engineering Division assigned to the subject of storehouses in order that the recommendations of both committees would be as nearly as practicable in accord and represent what could be recommended as best practice, but it has not been convenient for our committee to get together for the development of detail in season for submission with this report. The plan is one which we feel should be followed to a conclusion, the committee from the Engineering Division having furthermore expressed its willingness to co-operate.

Scrap Classification—Handling and Sales

The committee submitted the following changes in the Standard Scrap Classification:

Terms of Sale

Old Form	*Suggested Changes*
Sealed bids for this scrap to receive consideration must be in this office by 12 o'clock noon on.....	Sealed bids for this scrap, to receive consideration, must be in this office by 12 o'clock noon on..... and remain in effect until 12 o'clock noon on.....
Final shipping directions must be furnished within 10 days from date of award. When shipping directions for material are not furnished within 10 days from date of award, it shall be optional with this company to cancel the sale at any time thereafter.	Final shipping directions must be furnished within five days from date of award. When shipping directions for material are not furnished within five days from date of award, it shall be optional with this company to cancel the sale at any time thereafter.
	Note.—Majority report, five days: Messrs. Hoinville, Kirk, Jones and Hughes. Minority report, ten days: Messrs. Haynes and Munster.
Shipment will ordinarily be made within 30 days after receipt of shipping directions unless prevented by causes beyond our control. If shipment is not made within 60 days, prevented by causes beyond our control, it will be optional with either party to cancel balance due, within 10 days thereafter. Current tariff switching charges will be made for delivery to connecting lines.	Shipment will ordinarily be made within 30 days after receipt of shipping directions unless prevented by causes beyond our control. If shipment is not made within 45 days, prevented by causes beyond our control, it will be optional with either party to cancel balance due, within ten days thereafter.

Classification of Scrap Iron and Steel

10 Boilers, Fire Boxes and Tanks, Uncut. All kinds, attached or separate.	**8 Angle and Splice Bars, Patented Joints Only.**
	11 Boilers, Fire Boxes and Tanks, Uncut. All kinds, attached or separate. Specify whether with or without flues.
11 Boilers, Fire Boxes and Tanks, Cut Up. Iron or steel boiler or tank plate cut into sheets and rings.	**11 Boilers, Fire Boxes and Tanks, Cut Up.** Iron or steel boiler or tank plate cut into sheets and rings (with or without staybolts).
	Note.—Question of whether to include sheets from steel cars.
17 No. 3 Railroad Cast. Pieces weighing over 500 lb.; includes cylinders and driving wheel centers, and all other material that can be broken under a drop; otherwise same specification as Classification No. 15.	**17 Cast, Railroad No. 3.** Pieces weighing over 500 lb.; includes cylinders and driving wheel centers, and all other castings; otherwise same specification as classification No. 15.
29 Limed Iron and Steel. All kinds of material from interior of boilers (except flues which are encrusted with lime or corrugated by the action of water), such as crown bars, crown bar bolts, staybolts, etc.	**29 Limed Iron and Steel.** All kinds of material from interior of boilers (except flues which are encrusted with lime or corroded by the action of water) such as crown bars, crown bar bolts, staybolts, etc.
43 Sheet Scrap No. 2 and Miscellaneous. Includes netting, other than stack wire, all galvanized or tinned material, composition brake shoes and gas retorts.	**43 Sheet Scrap No. 2 and Miscellaneous.** Includes netting, other than stack wire, all galvanized or tinned material, composition brake shoes and gas retorts, and any other iron or steel material not otherwise classified.
82 Belting. No. 1 belting, leather, six inches wide and over. No. 2 belting, leather under six inches, punchings and trimmings. No. 3 belting, rubber, all kinds. No. 4 belting, compositions.	**82 Leather Belting.** No. 1 leather belting six inches wide and over. No. 2 leather belting, under six inches, punchings and trimmings. No. 3 rubber belting, all kinds. No. 4 composition belting.

Other changes suggested consisted merely in the wording of class designations.

The report is signed by C. H. Hoinville, chairman of the committee, A. T. & S. F.; J. C. Kirk, C. R. I. & P.; J. R. Haynes, C. B. & Q.; W. F. Jones, N. Y. C.; A. W. Munster, B. & M.; E. H. Hughes, K. C. S., and B. T. Jellison (chairman ex-officio), C. & O.

Railroad Losses in Colorado Exceed Five Millions

Early Estimate on Destruction to Property and Life Greatly Overshadowed by Recent Survey

REPEATED HEAVY RAINS and warm weather attacks on mountain snows have caused untold damage to Colorado railroads in the last two weeks. The catastrophe at Pueblo on June 3, which resulted in the death of several hundred persons and a $5,000,000 loss to the railroads, overshadows the troubles elsewhere in the state, but these collectively add a great sum to the flood bill imposed on the roads. Nearly all roads have suffered north of Denver. The Colorado & Southern, the Fort Collins branch of the Union Pacific and other lines were thrown out of service by washouts. Similar conditions near Sterling caused short interruptions to traffic on the Union Pacific and the Chicago, Burlington & Quincy. Later, about June 10, high water in the Grand and the Animas rivers threatened the Denver & Rio Grande near Grand Junction and Durango, respectively, while the Silverton branch of the former road is out of service.

The great local precipitation which led to the Pueblo disaster brought about a sudden runoff into the channels of the Arkansas River and its tributary, the Fountain, which joins in the city, and the rush of water which wrought such havoc in this city carried destruction to railway property from Canon City on the west to the state line on the east and as far north as Colorado Springs. As a consequence, not a single line of railroad was in a condition to carry relief trains into the city for two days after the flood.

The flood on the evening of June 3 passed through the heart of the city, covering a scene about one mile wide with a 12-foot blanket of madly rushing water. The flooded area included nearly all of the intensive terminal developments of the railroads entering Pueblo. In it were six railroad bridges over the Arkansas River, besides three over the Fountain River. Only one, the Santa Fe bridge to the Union Station, escaped. All the others lost one or more spans or large portions of approaches. The Missouri Pacific yard and engine terminal has been cut off by a new channel of the river, so it is now on an island without rail connection. A Denver & Rio Grande and a Missouri Pacific train were caught in the flood while trying to escape to high land, and the cars were overturned, with the loss of several lives, the number not known.

The two thousand cars in the yards during the flood suffered enormous damage; many were floated away and overturned or crushed by impact or pressure of debris. There were 467 overturned cars on the Denver & Rio Grande tracks alone in the Walker yard of that road. The effect was like that of a bad railroad wreck on every track. Some cars were floated great distances and will never be recovered.



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Overturned Passenger Trains on the Station Tracks. Pueblo Union Station Building on Right

The reclamation has been slow because of the debris and mud which covered all tracks except those in the path of the fastest water, many of which were washed out. A large part of the tracks were covered from one to two feet with mud and had to be dug out before cars could be moved. The Rio Grande and the Santa Fe roundhouses were in a like condition. Twenty carloads of mud had to be taken out of the Santa Fe turntable pit before a single locomotive could be released.

The first line to be opened into the city was the Rio Grande and Santa Fe route from Denver, detouring from one line to the other to avoid the worst washouts, and coming into the Santa Fe Eighth Street yard, the only one in shape to handle any cars at all. Next, the Denver & Rio Grande

Trinidad line was opened, and after clearing a track through the Union Station, it was possible to run trains through from Denver to Trinidad on June 9. The Missouri Pacific, after completing a long pile trestle approach to its Fountain River bridge, was able to bring in its first train from the east on June 12, using Santa Fe terminal tracks. The Santa Fe has driven a 1,000-foot pile trestle to take the place of its



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Railway Property in the Lower Part of the City

bridge over the Fountain and also repaired breaks in the approaches to the Arkansas River bridge near Nepesta, and was expected to resume service to La Junta about June 16.

this stretch. East of Nickerson, Kan., the river had crossed the roadbed at two different points into Bull Creek, and it is at these two points that the greatest damage was done.

The Rio Grande line north along the Fountain River was



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Arkansas River Bridges: Santa Fe on Left, Denver & Rio Grande on Right

cut by caving river banks, requiring shooflys totaling about three-quarters of a mile in length, and will be opened for traffic shortly. The line of this road to Salida suffered very heavy damage, consisting largely in washing track off the roadbed. Traffic will not be restored for ten days or more, as



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View in Yards South of Arkansas River

The regular service over the Santa Fe's Northern division will be restored on the night of June 14. A work train passed over this division on June 13, and two local trains were restored to schedule on June 14. In this district the roadbed between Syracuse, Kan., and La Junta, Colo., is very soft and it will be necessary to run trains very slowly over

a break in this line of the Rio Grande cuts the Denver-Salt Lake City line in two. Through passenger trains of the Rio Grande are now routed via the Union Pacific.

The Denver & Rio Grande was affected at so many points on June 14 that freight movement totaled only 150 train miles. The Colorado & Southern's Leadville line will be out

of service for at least two weeks. The Denver & Salt Lake has been subject to repeated traffic interruptions of short duration.

The Colorado & Southern's approach to Pueblo from the south will not be opened for some time, as changes in the channels of the Arkansas and Fountain rivers make it difficult to restore the north approach to this road's bridge over the Arkansas.

Reclamation of railway property in the city is progressing rapidly. Large numbers of wrecking cranes are picking up the overturned cars and many locomotive cranes are being used to clear tracks of mud and debris. The labor situation in the city has been good, as a uniform rate of pay established under martial law removes competition for men. The local supply is plentiful, and very few men have been recruited outside the city. Railways are as yet unable to estimate damage accurately.

Freight Car Loading

WASHINGTON, D. C.

AN INCREASE of 18,907 in the number of cars loaded with revenue freight during the week ended on May 28, compared with the previous week, was shown by reports from the railroads compiled by the Car Service Division of the American Railway Association. The total for the week was 787,237 cars. This was 110,970 cars under that for the corresponding week in 1920 but 23,476 more than were loaded during the corresponding week in 1919.

Increases as compared with the previous week were reported in the loading of all commodities except ore. The largest gain was made in the loading of grain and grain products, the total being 46,337 cars or 9,085 more than the previous week. A total of 164,870 cars were loaded with coal which was 6,358 cars greater than during the preceding week but 9,700 less than during the corresponding week last year.

Merchandise and miscellaneous freight, which includes manufactured products, showed a gain of 3,526 cars over the previous week, the total being 463,957, while the total loading of livestock was 27,518 cars or 1,150 cars higher than the week before. A total of 50,277 cars were loaded with forest products and 5,605 with coke. Reports showed 28,673 cars loaded with ore, or 1,500 below the week of May 21. Grain and grain products were the only commodities to show an increase over the corresponding week last year.

All districts reported increases in the number of cars loaded during the week which ended on May 28 over the previous week except the Pocahontas, although that district was the only one to report an increase over the corresponding week in 1920.

The freight car surplus for the period from June 1 to June 8 averaged 389,526, a decrease of less than 4,000, as compared with the previous week. Of the total, 147,656 were box cars and 162,035 were coal cars. On June 1 the percentage of bad order freight cars was 16.7 as compared with 16 on May 15.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, MAY 28, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded: This year	Corresponding year 1920	Corresponding year 1919	Received from connections: This year	Corresponding year 1920	Corresponding year 1919
Eastern	1921	7,456	2,723	45,301	1,151	5,840	2,596	56,358	69,248	190,673	.....	.....	198,331	.....	.....
	1920	5,295	2,652	50,718	3,310	7,922	6,530	24,928	111,084	.....	212,439	172,408	.....	243,378	207,142
Allegheny	1921	2,893	2,981	51,443	2,695	2,418	6,996	43,746	49,635	162,807	.....	.....	109,862	.....	.....
	1920	2,349	3,031	50,563	5,818	3,443	9,276	38,603	72,168	.....	185,251	157,312	.....	141,337	123,007
Pocahontas	1921	203	127	23,080	45	1,434	21	2,599	5,024	32,533	.....	.....	13,821	.....	.....
	1920	141	110	17,821	592	2,312	253	192	10,064	.....	31,485	32,981	.....	21,545	17,150
Southern	1921	4,862	1,794	20,424	597	14,840	758	38,392	32,583	114,250	.....	.....	61,698	.....	.....
	1920	3,449	2,010	21,221	118	18,507	2,929	25,708	51,545	.....	125,487	111,714	.....	86,002	46,868
Northwestern	1921	10,942	7,183	4,644	711	13,831	16,965	27,226	31,631	113,133	.....	.....	42,188	.....	.....
	1920	9,053	7,981	7,837	1,191	16,594	44,708	21,709	42,729	.....	151,802	133,949	.....	59,887	50,398
Central Western	1921	14,520	9,884	15,759	186	4,978	557	29,946	34,637	110,467	.....	.....	48,713	.....	.....
	1920	8,737	10,251	20,118	458	6,167	4,670	22,687	48,475	.....	121,563	101,235	.....	72,380	59,823
Southwestern	1921	5,461	2,826	4,219	220	6,936	780	16,828	26,104	63,374	.....	.....	44,578	.....	.....
	1920	4,014	2,642	6,334	193	7,302	1,060	16,768	31,867	.....	70,180	55,162	.....	52,072	46,470
Total, all roads	1921	46,337	27,518	164,870	5,605	50,277	28,673	215,095	248,862	787,237	.....	.....	519,191	.....	.....
	1920	33,038	28,677	174,612	11,680	62,247	69,426	150,595	367,932	.....	898,207	.....	.....	676,601	.....
	1919	35,523	28,624	153,642	.....	60,545	54,247	.....	431,180	.....	.....	763,761	.....	.....	550,858
Increase compared	1920	13,299	.....	.....	.....	.....	.....	64,500	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	.....	1,159	9,742	6,075	11,970	40,753	.....	119,070	110,970	.....	.....	157,410	.....	.....
Increase compared	1919	10,814	.....	11,228	5,605	.....	.....	215,095	.....	23,476	.....	.....	.....	.....	.....
Decrease compared	1919	.....	1,106	.....	.....	10,268	25,574	.....	182,318	.....	.....	.....	31,667	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

May 21	1921	37,252	26,368	158,512	5,337	50,216	30,214	216,030	244,401	768,330	862,074	777,324	508,969	666,585	557,879
May 14	1921	34,418	25,599	161,782	5,126	49,365	22,806	215,524	235,538	750,158	843,145	739,945	501,228	620,196	540,955
May 7	1921	34,847	27,123	143,323	4,626	47,095	13,041	213,535	233,435	718,025	843,184	753,287	495,386	594,418	549,712
April 30	1921	34,426	29,909	145,010	4,659	48,554	7,725	213,792	237,922	721,997	800,960	752,362	489,073	545,205	554,350

Short Lines Establish Consolidated Purchasing Agency

WASHINGTON, D. C.

AS ONE MEANS of lowering railroad operating costs, with which the Interstate Commerce Commission as well as the railroads, is actively concerning itself, the American Short Line Railroad Association has established a consolidated purchasing agency in Washington for the benefit of its membership throughout the United States. This membership now consists of some 500 separate railroad corporations with a combined main line mileage of approximately 25,000.

It is believed that important economies will accrue to the short lines by the combined purchases of their material requirements and that in like manner the cost to the manufacturer will be greatly reduced by dealing in quantities through one purchasing agency only, while serving at the same time some 500 railroads. This agency will have three sections or departments: new equipment and materials, second hand equipment and industrial development.

The so-called short line railroads of the United States vary in size and character from a small industrial railroad with practically a one-man organization up to a completely equipped railroad of several hundred miles. They are located in all parts of the United States, some in remote sections, and for this reason the selling expense to the manufac-

turer in proportion to the volume of business done is such that his margin of profit to these lines must be greater than to the trunk lines.

The plan contemplates that the consolidated purchasing agency will secure from these lines budgets of their anticipated requirements for the approaching quarter, and from these budgets the various items will be tabulated and consolidated. Inquiries will then be sent to the manufacturers on a basis of the aggregate quantities to be purchased, and they will be given shipping specifications at the same time to enable them to make up manufacturing schedules.

Where advisable, a blanket agreement will be made with a manufacturer covering a group of lines in a certain territory; or where practicable from a distribution standpoint; for the entire membership of the association, whereby all requirements in his line will be bought from this manufacturer.

Orders will either be sent direct by the member lines, or through the consolidated purchasing agency, as may be deemed most expeditious; but in all cases the material will be shipped and invoiced direct to the railroad company.

In the purchase of fuel, wherever practicable, an agreement will be made with mines or oil producers whereby their total output will be taken and distributed to a group of lines in that particular territory.

The locomotive and car builders will be asked to assist with composite designs of locomotives and cars, using, wherever possible, standards for which patterns are already available, and any other manufacturing practices which will make for economy in the construction of equipment and yet secure for the Short Lines the very best product obtainable.

There are a great many short line railroads that are endeavoring to use equipment entirely unsuited to their needs. In some cases this equipment was bought during the construction period and from divers sources. The short line has been unable to dispose of this equipment except at a sacrifice usually demanded in second-hand deals, and has, therefore, worried along with it at a considerably greater expense than if an exchange could be made for something different. The consolidated purchasing agency is, therefore, planning to send out questionnaires to each line, asking that it list such equipment or material as it desires to sell, with a fair price thereon; and in another column it will be asked to list such equipment or material as it desires to purchase provided proper disposition can be made of that which it has for sale. These items will then be tabulated and negotiations started between the various roads.

Wherever a short line railroad is in the market for second-hand equipment, and nothing of the desired quality and specifications is available among the members of the association, inquiries will be sent direct to the trunk lines and the sale of the equipment handled direct from the trunk line to the short line at a considerably lower cost than in the past where it has passed through a number of hands.

The short lines, located as they are in all parts of the country, originate a large quantity of raw materials used in various industries, and this department will devote its efforts to developing these various sources, primarily for increasing the traffic of the various lines, but of equal advantage to industries in general and to the entire railroad system of the country.

In the matter of cross ties alone, the short lines probably originate a very large percentage, and through the operation of this department, sales will be promoted between the producers along the short lines and those trunk lines not located in tie producing territories.

While it will require time and energy to work out the various details of this plan, considerable headway has already been made through the co-operation and help of the manufacturers. The members of the American Short Line Railroad Association are equally desirous of co-operating to the fullest extent, and as the consolidated purchasing agency will act as the medium between the two bodies, it would seem that the results are destined to be mutually advantageous.

James W. Cain, who has been appointed manager of purchases of the American Short Line Railroad Association, with headquarters in Washington, D. C., has had an extended experience both in railroading and in the supply business. He served a machinist's apprenticeship with the Atchison, Topeka & Santa Fe at Topeka, Kan., and later took a mechanical engineering course at Purdue University, graduating in 1905. From 1906 to 1907 he was assistant engineer of tests on the Atchison, Topeka & Santa Fe, and in 1907 he became general sales manager of McCord & Company, Chicago. After two years he was appointed chief engineer of the company at Detroit, which position he held until 1914, when he became vice-president of the G. F. Cotter Supply Company, and the Houston Tie & Lumber Company at Houston, Texas. He remained with this company until 1918 when he offered his services to the government and was assigned to the inspection of ordnance in the Chicago district. After the armistice he formed the firm of Cain-Smith & Co., consulting engineers at Houston, Texas, and was engaged in developing oil and mineral properties until coming to Washington to assume his new duties.

More Fruit and Vegetables Shipped in Spite of Higher Freight Rates

WASHINGTON, D. C.

SHIPMENTS TO MARKET of leading fruits and vegetables up to June 4 this year have been 15 per cent greater than during the corresponding period of last year, according to official statistics given in the weekly Market Reporter published by the Bureau of Markets of the U. S. Department of Agriculture under date of June 11. This report seems to controvert the assertion so frequently made that the increase in freight rates made on August 26 last year has decreased the shipments of fruits and vegetables.

According to the Market Reporter, the carload shipments of fruits and vegetables this season to June 4 totalled 367,741 cars, an increase of 58,560 cars as compared with last year. For the week ending June 4 the total was 8,105 cars as compared with 6,904 last year; for May the total was 34,524 as compared with 23,221; for April, 31,035 as compared with 20,250, and for March, 29,990, as compared with 25,185. The figures for the season to June 4 for the two years are as follows:

	1921	1920
Apples:		
Boxed	35,022	45,579
Barreled	68,989	41,278
Cabbage	11,659	13,044
Cantaloupes	1,199	1,313
Celery, Florida	4,148	3,002
Lettuce	12,031	8,790
Onions	4,704	6,148
Peaches	1,592	101
Potatoes:		
Sweet	17,567	15,423
White, old	186,755	159,927
Strawberries	9,192	5,139
Tomatoes	6,146	3,442
Watermelons	1,556	127
Vegetables, mixed	7,181	5,868
Total	367,741	309,181

"Severe declines in the prices of western cantaloupes featured the fruit and vegetable markets during the week ending June 6," the Market Reporter says. "The monthly report of carlot shipments shows that the volume of leading lines has been increasing for the past two months. May shipments totaled 34,524 cars compared with 31,035 in April and 29,990 in March. Movement of apples, cabbage, celery, lettuce and old potatoes showed big decreases, while the supply of cantaloupes, peaches, new potatoes, strawberries, tomatoes and watermelons recorded important increases. Carlot movement continues about 11,000 cars in excess of the corresponding month of last season.

Meeting of Railway Accounting Officers' Association

Concluding Session Addressed by Col. Colston, Director of I. C. C. Bureau of Finance

TENTATIVE PRINCIPLES relative to the action that the Division of Finance of the Interstate Commerce Commission was prepared to take as to maintenance charges during the guaranty period were outlined in an address by W. A. Colston, director of the I. C. C. Division of Finance before the concluding session of the Railway Accounting Officers' Association annual meeting at Atlantic City last week. Director Colston outlined the provisions of Section 209 of the Transportation Act relative to maintenance charges for the guaranty period, and invited the carriers to co-operate with his division in arriving at the proper solution of the problem represented. Mr. Colston's address is given in part as follows:

Maintenance Charges During the Guaranty Period

By Col. W. A. Colston
Director, Division of Finance, I. C. C.

In settling up the accounts under the guaranty of section 209, if we don't do something we will crucify the carriers on the cross of inaction. We have not been able to get a decision in the most important or most troublesome factor affecting the settlement of the accounts—the matter of maintenance, and I do not believe that we can entertain any great hope of obtaining a general ruling in the very near future. I think, however, that I have a way to suggest out of this trouble. I have been authorized by the chairman of Division 4 to put up a specific case or cases. I am willing to put up not only one specific case or cases as a test, but I am willing to put up the case of every carrier that wants to come in and talk the question across the table, and we can get a decision on each case just as well as we can in a general situation.

What I am going to submit is the plan upon which the Bureau of Finance is willing to enter into a discussion. It is not the decision of the Commission.

Provides an Accounting Method For Enforcing the Physical Test

I think that the basis for us to build our construction upon is the basis of the law itself. There has been no substitution of anything for the physical test. The physical test is provided as the final result that we must accomplish, and there is provided merely an accounting method for enforcing the physical test; and the result must be as nearly as practicable the same amount, character and durability of physical reparation. Less than that would be unfair to the carrier. More than that would be unfair to the United States.

In the President's Proclamation, when he took over the railroads, and in the paper annexed to that proclamation, he stated that there were two things that we must be assured of, first, that the railway properties should be maintained during the period of Federal control in as good repair and as complete equipment as when taken over by the Government, and, second, that the roads should receive a net operating income equal in each case to the average net income for the three years preceding June 30, 1917. The President promised to recommend those things to Congress, and he did recommend those things to Congress

When Congress started in to consider those recommendations it was made to appear that, although these two things were ordinarily treated as separate, nevertheless under the system of accounts laid down by the Commission, pursuant to Section 20 of the Act, there was an inseparable connection between maintenance and income and that, therefore, although the President had considered the two things as entirely distinct, it must be recognized that there was an inseparable bond between the two, and that provision must be made to recognize that fact, and Congress legislated with conclusive knowledge of the accounting classifications which had the force of law. Therefore, although Section 1 of the Federal Control Act provided "that the property should be returned in substantially as good repair, and substantially as complete equipment as it was at the beginning of Federal control," Congress recognized then that if during Federal control the carrier had over-maintained its properties you might still comply with that covenant and not give the carrier as much as it was entitled to, because the carrier would have reduced the income that it was entitled to claim during Federal control because of over-maintenance in the test period. On the other hand, if a carrier had under-maintained its properties and you made a double allowance—

(1) of income realized after under-maintenance or insufficient maintenance had been deducted, and
(2) then full maintenance.

you would be giving it more than it was entitled to. So Congress went a little beyond what the President had said in his proclamation, and provided that the United States should be reimbursed by deductions from the just compensation, or by other means, for the cost of any additions, repairs, renewals and betterments to such property not justly chargeable to the United States; recognizing that with compensation based on income for the test period, in the case of under-maintenance during the test period if the Government fully maintained the properties during Federal control it would be undertaking a greater maintenance than the carrier was entitled to, therefore, it should deduct from full compensation enough to bring down the allowance for maintenance to the standard actually observed in the test period by the carrier. And it was provided that in making these adjustments consideration should be given to the amounts expended or reserved by each carrier for maintenance and repairs, renewals and depreciation during the three years ended June 30, 1917, and the condition of the property at the beginning and at the end of Federal control, and any other pertinent facts and circumstances.

Possibly it would be well for me to indicate a syllabus of the tentative principles we propose to use in the Bureau.

Amounts to Be Charged for Maintenance

First, our rule is that in fixing the maximum amounts to be included in operating expenses for maintenance under the guaranty of section 209 of the Transportation Act, 1920, the Bureau of Finance will, as far as practicable, under the accounting test established by the proviso of Section 5 of the standard contract, fix such amounts as would have resulted during the guaranty period in the same amount, character and durability of physical reparation as was applied to the respective carrier properties, during an average six months of the test period, three years ending June 30, 1917, making due allowance for differences in the amount and use of the properties involved.

Adjustments for Charges in Cost of Labor

Second, in making the adjustments for changes in cost of labor consideration will be given to all changes of any character which affect in any way the labor cost of material in place, and will include not only changes in price of labor per payroll hour or other unit paid for, but also the relation of time paid for to effective time of work, differences in the efficiency and cost of labor due to changed personnel, and any other elements affecting the aggregate cost of labor necessary to affect the standard of maintenance observed by the carriers respectively during the test period.

Depreciation and Repairs

Third, in fixing the maximum maintenance allowance for the properties during the guaranty period, all charges representing depreciation and repairs will be computed upon the same bases for the guaranty period as were used in the test period.

The Accounting Test

Fourth. In the computation of railway operating income or any deficit therein for the guaranty period for the purpose of section 209 of the Transportation Act, 1920, the provisions of paragraph (3) of sub-division (f) of the section are provisions limiting the inclusion for guaranty computation of maintenance expenses to amounts actually charged or chargeable on the carrier's books of account under the accounting rules of the Commission, and do not contemplate any increase in or addition to such charges for the purpose of the guaranty settlement.

Amount and Use of Properties

Fifth. While adjustments for differences in the amount and use of properties involved are not merely matters of accounting to be

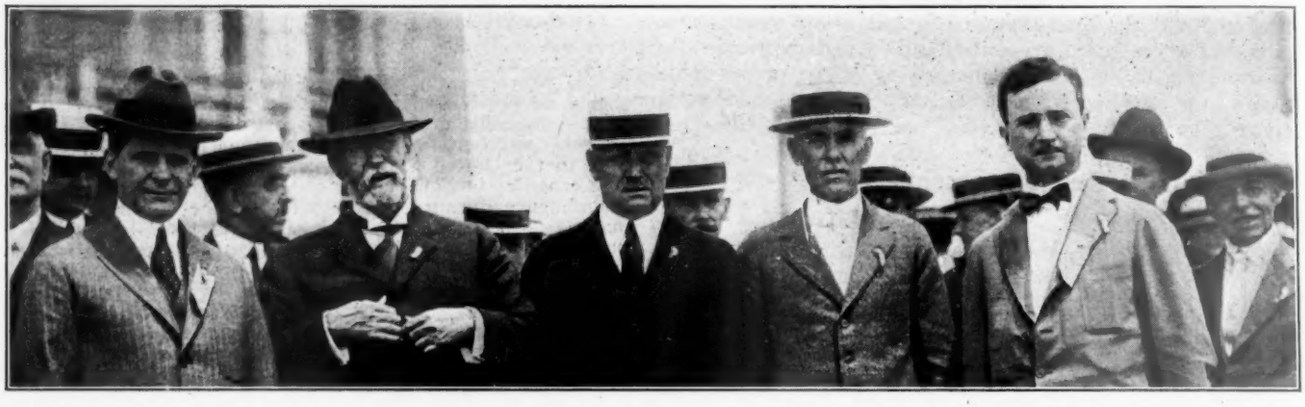
settled by the application of fixed and unalterable rules that may be followed by accountants and statisticians, and many adjustments may present serious practical questions not to be anticipated by any rules or formulas, nevertheless, within the limits required by practical substantial settlement of these matters, certain general rules may be determined by men who have had actual extensive experience in the railway field, and carriers are invited to appoint representatives to meet the representatives of the Bureau of Finance to consider and recommend fair and workable formulas for the determination of these questions in specific cases, with the right reserved to any carrier involved in a determination to show that in its case the general rule would be inequitable.

The Tentative Formula

I will give the results of a tentative formula which we have worked out and which I have submitted to one carrier to be discussed beginning with the commencement of next week, and it is substantially this, applying these principles as to maintenance of way and structures, there shall first be deducted from the total charges for maintenance of way and structures for the average six months of the test period the following elements:

1. Depreciation.
2. All charges for retirements based on original cost.
3. Assessments for public improvements.
4. Fire losses.
5. Injuries to persons.
6. Insurance.
7. Possibly joint facility accounts. I have an open mind with respect to the seventh item.

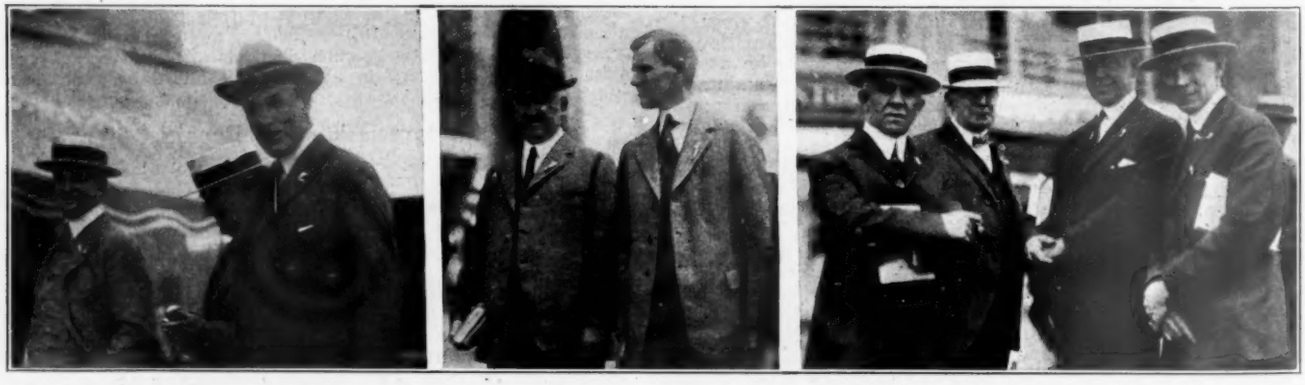
The remaining expenditures, representing material and labor actually expended and directly chargeable to maintenance of way and structures shall be divided so as to ascertain the amount of material and the cost thereof utilized during the average six months of the test period, and such cost shall be equated at



The Officers of the R. A. O. A.—left to right: J. J. Ekin, Comptroller, B. & O. and First Vice-president, R. A. O. A.; L. F. Loree, President, D. & H., who addressed the Opening Session; J. G. Drew, Vice-president, Mo. Pac. and President, R. A. O. A; L. G. Scott, Vice-president and Comptroller, Wabash and Second Vice-president, R. A. O. A.; E. R. Woodson, Secretary, R. A. O. A.



Legt to Right: John F. Mitchell, Ticket Auditor, A. T. & S. F.; J. C. Briggs, Auditor Passenger Accounts, St. L.-S. F. and chairman R. A. O. A. Committee on Passenger Accounts; L. C. Esschen, Auditor Passenger Receipts, I. C.
Right-hand Picture—left to right: F. W. Main, Auditor Freight Overcharge Claims, C. R. I. & P.; A. E. Fowler, General Auditor, So. Ry. and chairman, R. A. O. A. Committee on Disbursements; S. L. Porter, Auditor Expenditures, C. B. & Q.; A. Hermany, Assistant General Auditor, C. R. I. & P.



Left to Right: F. W. Charkse, Comptroller, U. P.; G. E. Bissonnet, General Auditor, U. P.; A. D. McDonald, Vice-president and Comptroller, So. Pac. and chairman R. A. O. A. Committee on General Accounts.
In Center Picture—left to right: Paul Peters, Auditor Freight Traffic, C. R. I. & P.; G. E. Bramon, Auditor Freight Accounts, C. B. & Q. and chairman of R. A. O. A. Committee on Freight Accounts.
Right Hand Picture—left to right: F. S. Fowler, Chief of Depreciation Section, I. C. C.; F. H. Harvey, General Auditor, P. & W. V.; Alexander Wylie, Director, Bureau of Accounts, I. C. C.; Will H. Carleton, Assistant Director of Accounts, I. C. C.

The Officers, Committee Chairmen and Other Members of the R. A. O. A.

guaranty period prices to determine the amount for material allowable for the guaranty period. In addition to the allowance for material thus obtained, the carriers will be allowed all actual cost of labor or other expenses incident to putting such material in place. In ascertaining such guaranty allowance for labor and other expenses incident to putting such material in place, the maintenance of way and structure expenses for the guaranty period shall be segregated similarly to the way in which the test period expenses were segregated after taking out the seven items which I have indicated. The remaining expenses representing labor and material are to be separated between the two elements, and the ratio between the two shall determine the allowance for labor in connection with the allowance for material as we have stated. For instance, if the test period material cost equated at guaranty period prices is $100,000 and the total labor cost during the guaranty period was twice the total material cost during the guaranty period, the labor allowance for the guaranty period will be $200,000. To the items of labor and material thus allowed we shall, of course, add back the eliminated items adjusted as may be proper in each case.

That is a very general rule and we shall have to make an additional computation. Our rule contemplates calculation at one step of differences in cost of labor arising from differences in price and differences arising from factors other than price. And in order that the Commission may know what is involved in the controversy we shall require intermediate adjustments similar to those which are provided for in Exhibits B and C, I think, of the report of the Sub-committee of the Adjustment Committee of the Executives Association, one of which will show the facts up to the point where you adjust for differences in price of labor and for labor paid for but not worked, because of the regulations as to punching the clock, going to and from work on company's time, etc. In other words, it would show the adjustment of the cost of the effective hours of labor regardless of efficiency, and then the second step will be that which is shown by Exhibit C, which is the adjustment for factors other than price, which will include efficiency or inefficiency and any other elements that may affect the cost of material in place. So we would set forth here the result with respect to all the labor costs for the guaranty period.

For maintenance of equipment, the same procedure will be followed as I have indicated for maintenance of way and structures, except we will make a separate ascertainment for

1. Steam locomotives.
2. Other locomotives.
3. Freight train cars.
4. Passenger train cars.
5. Work equipment.
6. Floating equipment.
7. Miscellaneous equipment, or such combination of the elements as may be found necessary in making the ascertainments.

That, I think, will outline the methods which we purpose to employ. We want to sit down and talk these matters over with you across the table. My advice is don't wait for a final determination on the maintenance question as affecting all the carriers. Come down and present your own case and let us settle it upon these principles or upon these principles as modified after discussion with you. Let's get down and have a heart to heart talk, and I assure you that in the Bureau of Finance we will endeavor on the one hand to so administer this Act, and make our recommendation that we will at least observe the constitutional prohibition against taking of private property for public use without just compensation, and on the other hand I have no doubt in the assistance and in the aid that will be given to us by those with the understanding and the integrity of the members of the Accounting Officers Association.

Report of the Committee on Disbursement Accounting

The first part of the report of the meeting of the Railway Accounting Officers' Association was given in last week's issue of the *Railway Age*, pages 1343 to 1354. The report as given in the *Railway Age* covered the meeting as far as part of the report of the Committee on Disbursement Accounting. Other important subjects discussed by that committee follow:

Wage Statistics. This subject received considerable attention, particularly because of the new rules issued by the Railroad Labor Board which become effective July 1, 1921. The committee submitted the following in the supplementary agenda:

Your committee has considered the order of the Interstate Commerce Commission, issued under date of April 18, 1921, prescribing rules governing the classification of steam railway employees and reports of their services and compensation, effective July 1, 1921. Several forms for compiling the required data were submitted by carriers, which illustrated the wide difference in their respective organizations.

The rules issued by the United States Railroad Labor Board are comprehensive and will serve to guide each carrier in classifying its employees, and enable them to compile the information from their existing sources of information, with such changes as may be necessary.

In order to bring about uniformity in the reports, it is recommended that all carriers adopt nomenclature of the Labor Board's rules for use on payrolls and all supporting papers.

Your committee does not believe it possible at this time to make any recommendations as to specific forms to be used in collecting the data under this order, for the reason that the organizations of the carriers are so different. In some instances, the data will be assembled at division headquarters, while in other instances, it will be done in general offices. Standardization of forms and plans for this work should be deferred until the carriers have had at least one year's experience.

Making R. A. O. A. Interline Accounting Recommendations Mandatory. In accordance with the policy outlined by the Executive Committee in the minutes of its meeting held in Chicago, February 15, 1921, the following recommendations are made by the Committee on Disbursement Accounts:

The following rules, relating to inter-road disbursements accounts, shall be mandatory and binding upon carriers who are members of the Railway Accounting Officers' Association, operating in North America, and shall become effective and operative as of January 1, 1922;

Rule 482 R. A. O. A. Synopsis 1920, reading as follows:

Loss and Damage Claim Authorization Blank—As a means of facilitating the ready identification of the authorization blank when attached to claim papers, R. A. O. A. Standard Form 200, Loss and Damage Claim Authorization Blank—shall be printed on salmon colored paper.

Rule 484, R. A. O. A. Synopsis 1920, be made to read as follows:

Standard Form of Bill Blank—Carriers must use the standard form of bill blank, R. A. O. A. Standard Form 206, as between carriers, except for car repairs.

Subject 12—Current Docket, Committee on Disbursement Accounts, Settlement of Per Diem Balances—Rule to read as follows:

The settlement of Car Service and Per Diem balances between Carriers should be by draft on net balances, net balances to include the debits and credits for per diem accrued in the same month; also corrections on reports previously rendered and delayed reports for previous months.

Reports to creditor lines shall be forwarded by the 10th day of the second month following that in which per diem accrued (see Rule 11, Paragraph A of American R. R. Association, Current Code of Per Diem Rules) and settlements thereof shall be subject to draft on the 25th day of the second month, i. e., the second month following that in which per diem accrued.

Subject 15—Current Docket, Committee on Disbursement Accounts, Rendering Bills Collectible in Duplicate—The rule to read as follows:

All bills against other carriers (except for car repairs) must be rendered in duplicate.

Subject 19—Current Docket, Committee on Disbursement Accounts, Standard Form for Use in Tracing for Unpaid Bills.—The rule to read as follows:

All tracers for unpaid bills between carriers shall be accompanied by a statement of such bills on R. A. O. A. Standard Form 210, rendered in duplicate, the original to be returned to the forwarding carrier, and the copy retained by the receiving carrier.

The description of account on the tracer must be clear and concise, and that for bills covering the shipment of material, must show the destination of the shipment.

Subject 29, relating to the rendition of bills covering the joint use of facilities was included in the agenda, but it was voted to omit it from the mandatory rules.

[Herewith follow the rules for arbitration similar to those recommended by the Committees on Freight Accounts and on Passenger Accounts.]

The report is signed by A. E. Fowler, auditor, Southern Railway, chairman.

Report of the Committee on Overcharge and Agency Relief Freight Claims

The committee report consisted of various detailed recommendations relating to the overcharge claim rules.

Minimum Charges on account of Overcharge Claims. This was the most important subject which the committee discussed. The committee submitted the following:

There is now in effect a minimum of $1.00 for adjustments incident to interline freight accounts and junction settlements which correction minimum is the same amount as the R. A. O. A. Overcharge Claim Minimum.

To create a disparity between these two minimums, such as would result

from increasing the R. A. O. A. Overcharge Claim minimum and allowing the interline freight account minimum to remain at $1.00, would create a situation that would probably disturb uniform interline accounting. That phase is regarded as being of serious concern to some, if not all, carriers.

On the other hand, it is maintained that to increase both the R. A. O. A. Overcharge Claim minimum and the interline freight account minimum would gravely affect the revenue of some carriers.

The argument is advanced that the R. A. O. A. Overcharge Claim minimum should be increased on account of the additional expense involved in clerical hire and similar expenses incident to handling overcharge claims.

Your Committee is not convinced that the convenience of an increased Overcharge claim minimum will offset or surpass the effects in other directions, therefore.

Your Committee recommends that the R. A. O. A. Overcharge Claim Minimum remain $1.00.

The report is signed by E. J. Bloodgood, auditor of freight accounts of the Chicago & North Western, chairman.

Report of the Committee on Terminal Companies' Accounts

The committee submitted recommendations dealing with various phases of accounting by terminal companies. One of the more important subjects covered was the following:

Standardization of Terminal and Switching Companies' Forms

As a result of study and investigation, your committee reached the following conclusions:

Terminal companies doing a regular freight or passenger business are constrained to use, and do use, as far as posible, the R. A. O. A. Standard Forms.

The various terminal companies throughout the country are so diverse in their operations and there is such an absence of similarity in their methods and in their contracts with tenant lines, which in some cases are the owning lines, that there is necessarily some reasonable limitation to standization of forms in this connection.

It is the opinion of your committee that a standard form of Conductors' Car Report, Joint Mileage Per Cent Sheet and Summary of Joint Expenses, could be devised, it being understood that the arrangement of and information shown on the forms could be modified to meet the individual requirements of some companies.

Your committee, therefore, recommends, for adoption by the Association, as R. A. O. A. Standard Forms, the following, as per samples submitted herewith:

R. A. O. A. Standard Form No. 400, Conductors' Car Report.

R. A. O. A. Standard Form No. 401, Joint Mileage Per Cent Sheet.

R. A. O. A. Standard Form No. 402, Recapitulation of Joint Operating Expenses.

The report is signed by F. B. Huntington, general auditor, Baltimore & Ohio Chicago Terminal, chairman.

President's Address

During the past year, the greatest volume of work ever turned out by the association in any one year throughout its entire history has been performed. You have had before you approximately 300 subjects, to say nothing of special committee reports and other extraordinary matters.

By submitting recommendations on 56 subjects in 1917, the Committee on Freight Accounts established a record for handling the largest number of subjects ever handled by any one committee in any one year *up to that time.* During the past year, the Committee on Freight Accounts has again made history by handling 77 subjects, thus excelling its own high record, while each of the Passenger and Disbursements Committee have by far exceeded its own respective previous "high water" mark.

There is one suggestion, in connection with the future, which I should like to offer for consideration and action by the Executive Committee. Accounting is practically the only important branch of railway work that does not have a magazine or regular publication devoted to it. The outstanding hiatus in railway accounting, from my viewpoint, is the lack of educational opportunities. The only way by which, under the existing conditions, any ambitious person may progress in railway accounting is by actually doing the work, which, is in principle, the old apprenticeship system that was abandoned, in connection with all other professions, many years ago. My opinion is that a magazine or periodical devoted to railway accounting would be helpful to the accounting officers and would prove particularly beneficial to ambitious clerks, agents and others. There are some practical difficulties, in connection with such a publication that would need to be worked out, but I do not believe that those difficulties are insurmountable. I therefore, commend, to the Executive Committee, the thought that the establishment of a periodical, devoted to railway accounting, would be a step for the advancement and development of our profession.

There is another matter of a momentous nature to which I call your attention. In my opinion, the necessity exists for our association to take action promptly and effectively towards constructing uniform, workable, useful physical statistics; that is statistics which will visualize the physical characteristics, developments, operations, etc., of the carriers. Statistics of that nature, if made practical and applicable to all carriers, would unlock the great storehouses of railway accounting and make available the stupendous funds of information stored there. Those statistics should be made such as to present a picture of the conditions that prevail. Clearly, there rests upon the carriers, under existing conditions, an obligation to undertake studies of that nature and the accounting officers, who have available such a tremendous stock of data, could well inaugurate the necessary plans, although any studies made along this line should, naturally, have the co-operation and collaboration of other interested departments. My recommendation is that our association forthwith create a committee to handle this subject.

It is generally admitted that a science or profession makes progress in the same degree that the ideas or ideals of the men engaged in that science or profession advance. It has been, and is, the policy of the Railway Accounting Officers Association to maintain and foster the loftiest ideals for the science and profession of railway accounting. The association finds its field of productive effort in the individual interest and professional pride of its members in the advancement of railway accounting. No more convincing proof can be offered of the effectiveness of those efforts than the tremendous strides which have been and are being made.

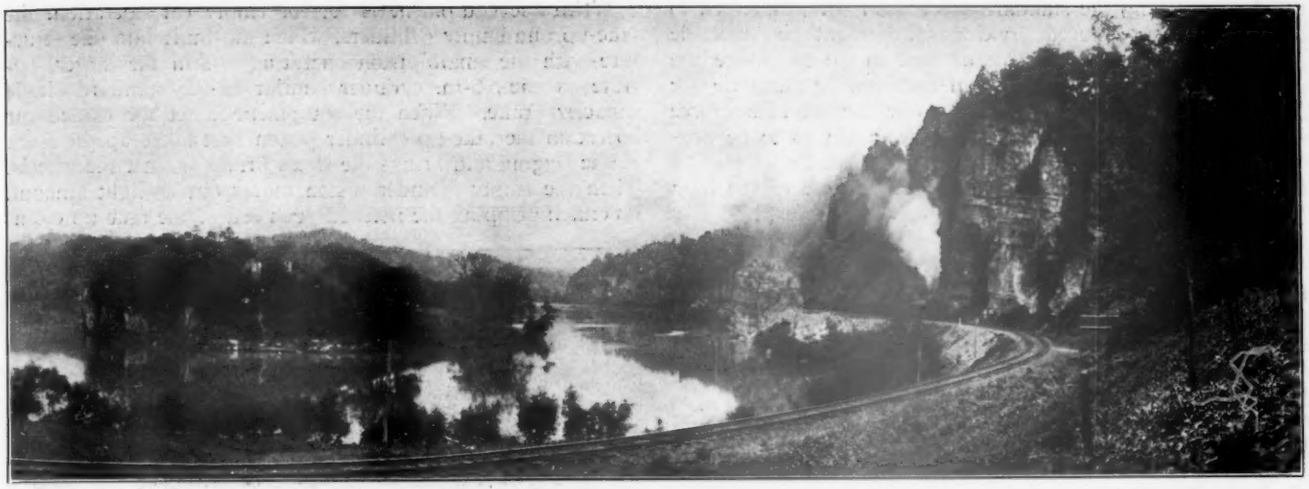
Practically every railroad is so organized that the accounting department is not under the jurisdiction of an officer who originates expenditures or revenues.

In the days long gone by, nearly all of the railway accounting officers had the title of auditor. The title was significant because then they merely audited accounts or kept books. Today, many accounting officers have the title of vice-president or comptroller. Most chief railway accounting officers are executive officers. They are able to serve the carriers more effectively by having a wider and broader viewpoint—by being analysts, advisors—and not mere recorders. Although the corollary to freedom of action and judgment is added responsibility there are compensating opportunities for development and progress.

Other Business

The association was addressed on Thursday morning by Commander C. A. Mayo, Navy disbursing officer, and on Friday morning by W. A. Colston, director of the division of finance of the Interstate Commerce Commission. Mr. Mayo spoke on the relations between his department and the railroads. Mr. Colston spoke as above noted on the subject of settlements for the guaranty period.

The election of officers resulted in the choice of J. J. Ekin, comptroller, B. & O., as president; L. G. Scott, vice-president and comptroller, Wabash, first vice-president; A. J. County, vice-president, Penn., second vice-president, and E. R. Woodson, secretary. The following were elected members of the executive committee: J. G. Drew, vice-president, Mo. Pac.; F. W. Charkse, comptroller, U. P.; W. C. Wishart, comptroller, N. Y. C. and E. Deschenes, comptroller, C. V. The decision as to the time and place for the next annual meeting was left with the executive committee.



The 100-Car Demonstration Train Rounding a Curve on the New River

Virginian Demonstration of Double-Capacity Brake

Speed Regulated Within Narrow Limits—Low Air Consumption a Notable Feature

IN AN ARTICLE on the operation of the Virginian Railway in the issue of May 27 there was published an account of the air brake demonstrations conducted on that road on May 25-27. Only the general results of the runs were given as more specific data was not available at that time. The report of the brake performance has now been made public and a more extended description of the results is therefore given below.

The double capacity brakes as applied on the Virginian 120-ton cars represent the latest development of the Westinghouse Air Brake Company's equipment for long trains of extremely heavy cars. Some time previous to the introduction of the 120-ton car, the road had consulted the air brake company with regard to handling still greater tonnage by operating 90 or more 55-ton cars per train. This brought up the question of applying a special brake with a double capacity feature, the KCE 10-10, which had already been developed in anticipation of a demand for heavy-tonnage operation that would necessitate the use of a brake providing a more uniform breaking ratio, lighter retardation on empty cars with a substantial reserve braking force available in the case of loaded cars.

Eleven hundred of the 55-ton cars of the type then in use were equipped accordingly with the double capacity feature. The results were so gratifying that the Virginian saw the possibility of extending the use of such apparatus to cover the requirements of much heavier rolling stock.

During the spring and summer of 1914, the advisability of increasing the capacity of the individual car was suggested with the object of not only increasing the tonnage of the train, but at the same time decreasing its length. This suggestion resolved itself into the 120-ton capacity car. The Virginian ordered the construction of the cars on the assurance of the Westinghouse engineers that the first double capacity brake had been further developed to a point that would meet the requirements of the heaviest car that any railroad could conveniently handle from the standpoint of motive power.

The problem of providing the proper brake equipment for these record-breaking cars was solved by minor modifications in the double capacity equipment, which had already been brought to a high degree of development in anticipation of a demand for freight brakes of exceptionally high capacity. It is significant of the well-rounded development of the air brake art that the conditions to be met on the Virginian involved only one new factor, the high ratio of loaded weight to the light weight of the car. The grades presented no special difficulty since trains are being handled daily with air brakes alone on much steeper gradients. The length of the train was no greater than has been successfully handled with the existing equipment and the total weight of the train is of secondary importance since each additional unit increases the braking force correspondingly.

The principal problem in braking these heavy cars, as already stated, was to provide a suitable ratio of braking force to car weight, both loaded and empty. The equipment as finally applied and demonstrated between Princeton and Roanoke is known as Schedule KDE-4-10-16, indicating that three cylinders, whose diameters are represented by the figures, are employed. A change over valve and a load reservoir are used to provide the flexibility in braking force which makes it possible to obtain a uniform braking ratio in solid trains of loads, solid trains of empties, or mixed trains. The cylinders in load operation augment each other in such sequence that only a short piston travel is required in each case, making for practically normal air consumption, though providing a much greater braking force than is obtainable with the standard single capacity brake. The relative braking force and air consumption of the double capacity brake and various types of single capacity equipment are clearly shown in one of the diagrams.

Operation of the Westinghouse Double Capacity Freight Brake Equipment

The fundamental characteristic of the Double Capacity freight brake equipment is that it provides for the same percentage of braking force (ratio of total shoes pressure to car weight) on a loaded car as on an empty car.

With the single capacity brake the braking force developed is constant in magnitude but varying in its relation to the car weight. Consequently, it is much less effective on a loaded car than on an empty car. The usual practice has been to so design the brake layout as to provide the highest practicable percentage of braking force on the empty car,

60 per cent being the standard for freight cars, and then to accept whatever reduced braking ratio might be available for the loaded car. This means that in grade service the retarding force on a loaded train may not be adequate for safe control, and in level road service the retarding force may vary so much throughout a mixed train as to be productive of damaging shocks. Furthermore, in long trains of empties, severe shocks are often created because of the high braking ratio, which manifestly cannot be lowered if any appreciable braking force is to be realized on a loaded car, and also because of the inherent serial action of a purely pneumatic brake.

In the effort to mitigate these undesirable effects, various expedients are sometimes resorted to which are far from satisfactory, and restrictions are often imposed on train make-up and operation which tend to curtail traffic.

Obviously the ideal condition is that in which the braking force on loaded cars bears the same relation to the loaded weight as that on the empty car bears to the light weight, so that adequate and uniform retardation may be possible.

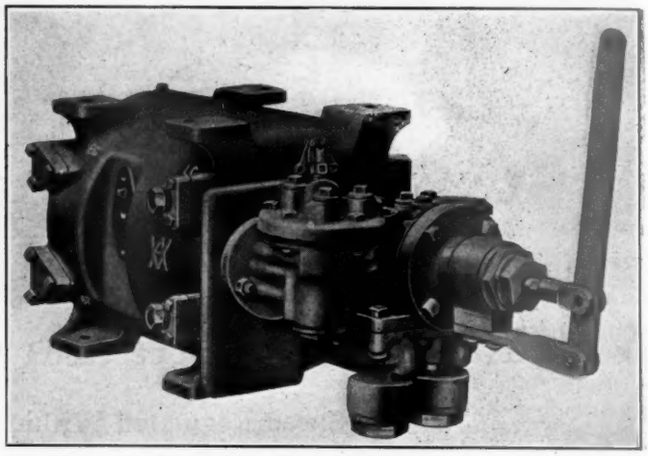
The ideal condition, always desirable, becomes imperative with heavy tonnage trains made up of high capacity cars, because of the great difference between the loaded and empty car weights. In other words, the operating conditions of loaded and empty trains with modern equipment are so widely separated that any attempt at a compromise between the two will result in unsatisfactory operation with either one or the other. The degree of retarding force set up on an empty car must be such as to permit a train of empties to be handled without the possibility of unduly severe shocks. On the other hand, with a loaded car a degree of retarding force must be provided which will be adequate to control safely a loaded train down a grade. These two requirements are so far apart that a solution of the problem is possible only with a *double capacity brake,* one which will be equally as effective when the car is loaded as when it is empty.

With the Double Capacity brake equipment the brake layout is designed to provide for 40 per cent braking ratio as against the usual 60 per cent for an empty car (permitting smoother brake operation on long trains of empty cars), and also 40 per cent for the loaded car as against the usual average of 15 per cent.

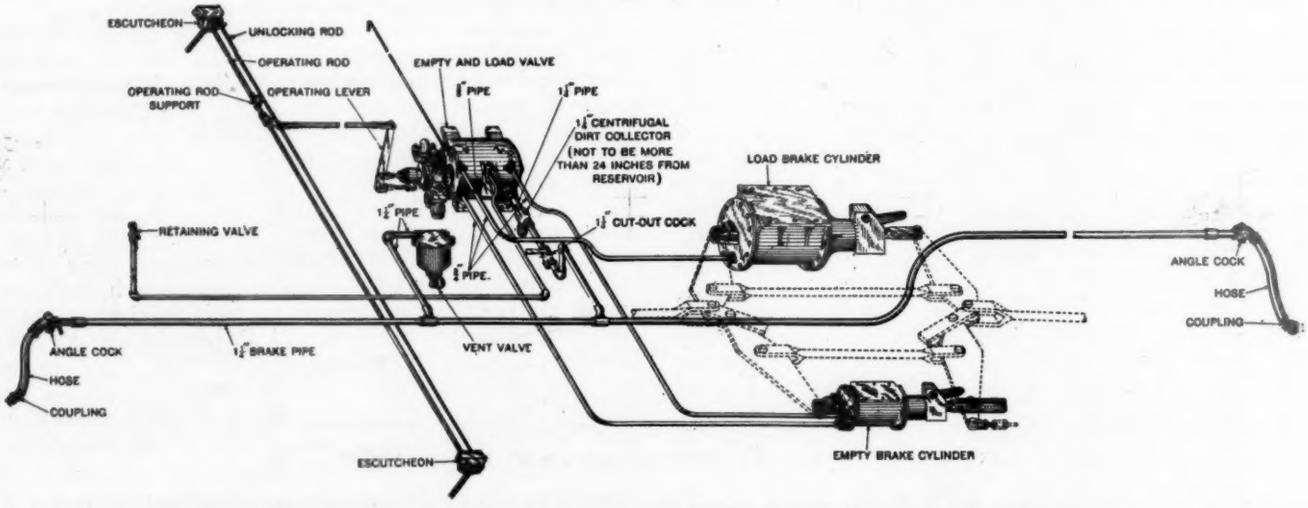
The equipment, known as schedule KDE-4-10-16, has three brake cylinders of the size indicated by the numerals. They are the take-up cylinder, the empty cylinder and the load cylinder respectively. In addition to the usual auxiliary reservoir there is a small load reservoir provided to supply the additional air required for loaded car braking.

When the equipment is set for empty car operation, the take-up and empty cylinders, which are built into one structure with the small piston operating within the larger, operate as one 10-in. cylinder similar to the standard single capacity brake. When the equipment is set for loaded car operation the take-up cylinder piston first takes up the slack in the rigging and brings the shoes firmly against the wheels. Then the empty cylinder piston moves out a slight amount, its clutch gripping the notched push rod of the take-up cylinder piston, thus supplying additional force. Finally, as the brake pipe reduction continues, the load cylinder piston moves out a slight amount, gripping its notched push rod and adding to the force already developed, through the connecting rods and levers. By this method of slack take-up and short travel of the larger pistons the volume of air required for a given application is reduced to a minimum. In addition, especially where retaining valves are used, after the first reduction required to bring the load cylinder into operation (about 12 lb.), all succeeding reductions are much lighter, and consequently the air consumption is more economical than with any other form of equipment for a corresponding degree of train control, and still within the capacity of the standard 1¼ in. brake pipe—an important requirement.

The higher braking ratio necessary for the loaded car can only be obtained when desired, since the equipment is manually changed for loaded car braking, through the me-



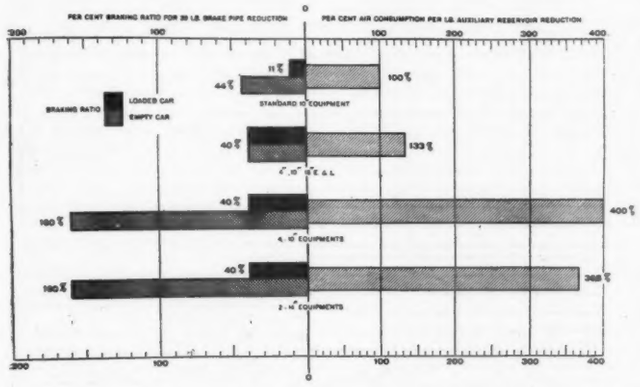
Double Capacity Brake Equipment; Triple Valve Change Over Valve and Two-Compartment Reservoir



General Arrangement of Double Capacity Brake Equipment on the Car

dium of an operating mechanism which shifts a change-over valve to its load position. This valve functions similarly to a number of cut-out cocks to effect the proper volume and port arrangements, and also controls the flow of air to the cylinders in the proper sequence.

The equipment may be manually cut into empty posi-



Comparative Braking Ratios and Air Consumption for Various Brake Equipments

tion again, or if this is not done, it will automatically return to empty position when the pressure in the system leaks down to about 15 lb., as would be the case, for example, when the car is being unloaded on a siding.

The triple valve used with this equipment (designated the K-E-N) possesses the same essential characteristics of quick service, uniform recharge and uniform release as are embodied in the well known K type of valve now in general service. A separate quick action device in the form of a brake pipe vent valve is employed.

Attention should be called to the fact that the unit system, fundamental to all brake equipments now in use on freight cars, is preserved with this new equipment, so that if there be excessive brake cylinder leakage on one car it affects that car only and does not interfere with the proper operation of the remaining brakes in the train. This feature insures the desired flexibility and safety of brake control.

Further Details of Standing Tests

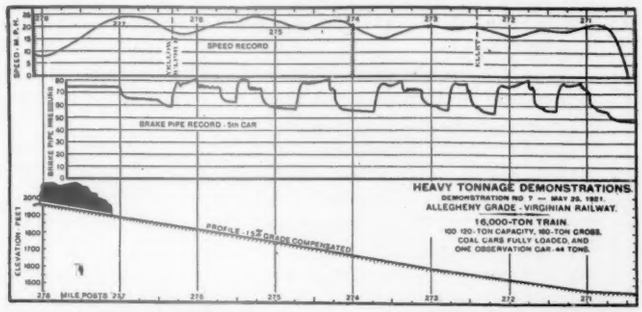
As the cars were assembled for the standing tests the train brake pipe, exclusive of the branch pipe on locomotive and tender, measured 4,097 ft. on the 70 car train, and 5,837 ft. when the additional 30 cars were later cut in.

No. 1—10-Pound Service Application—Brakes in Empty Position

The time from brake valve movement to piston start on Car 70 was 13.9 sec.; the rate of quick service propagation, 294 ft. per sec., or 201 m.p.h. The resultant cylinder pressure on Car 1 was 35 lb. and on Car 70, 25 lb. The time from movement of the brake valve to full release position to start of release on Car 70 was 10.5 sec.

No. 2—Emergency Application—Empty Position

Time from movement of brake valve to emergency position to piston start on Car 70, 7.5 sec.; rate of emergency propagation, 546 ft. per sec., or 372 m.p.h. The resultant cylinder pressure on Car 1 was 54 lb., on Car 70, 51 lb.



Speed and Brake Pipe Pressures on Allegheny Grade, 100-Car Train

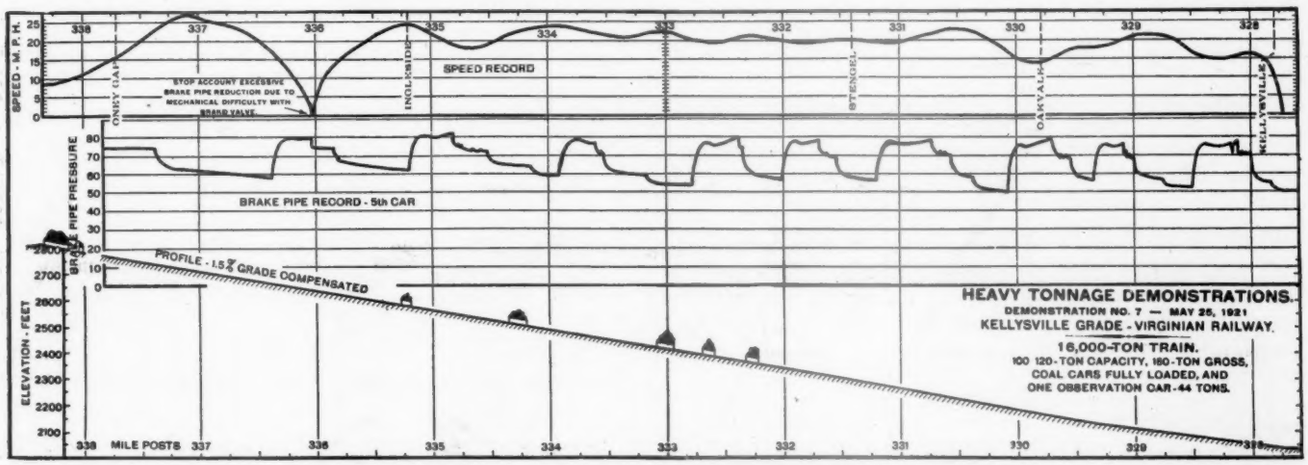
no compensation for 37 ft. connection between cars 35 and 36). The resultant cylinder pressure on Car 1 was 54 lb., and on Car 70, 51 lb.

No. 3—Emergency After Service Application—Empty Position

Service pressure in pounds, Car 1, 36; Car 70, 19. Service time in seconds, 13.8. Emergency pressure in pounds, Car 1, 53; Car 70, 50—time, brake valve to car 70, 8 sec.

No. 4—To Illustrate the Double Capacity and Air Economizing Features

It was demonstrated that the brake cylinders operated in the intended sequence, as follows, take-up cylinder, empty



Speed and Brake Pipe Pressures on Kellysville Grade, 100-Car Train

cylinder and load cylinder on application and in reverse order on release. The time from movement of brake valve to start of release on car 70 was 21 sec.

No. 5—Automatic Return to Empty Position

The return to empty position occurred on Cars 1 and 70 when pressures were between 15 and 10 lb.

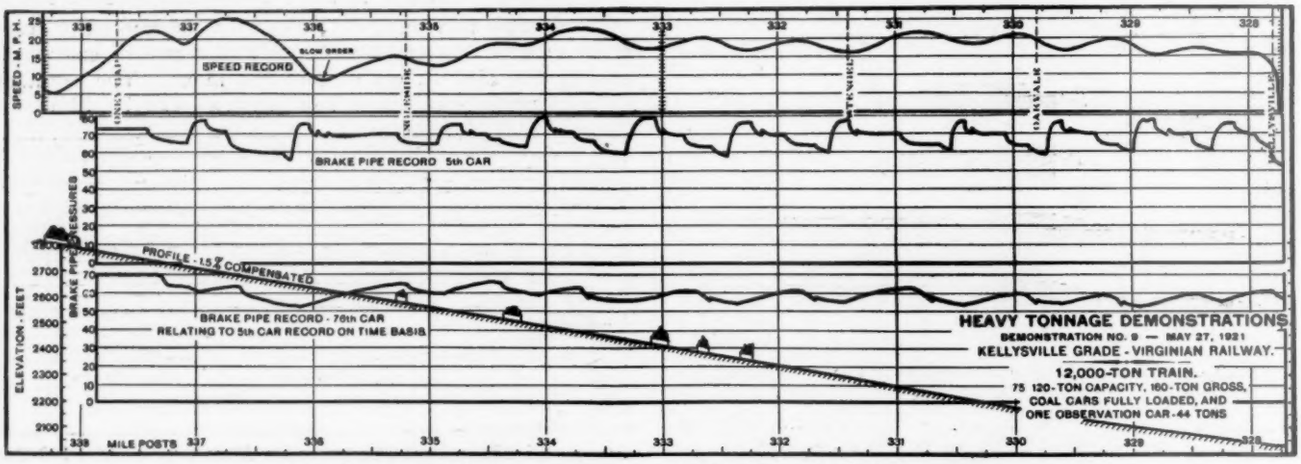
After the completion of Demonstration No. 5 the train was increased to 100 cars by adding 15 cars to each of the strings.

No. 6—Brake Cylinder Leakage

Cocks having No. 8 drill (.199 in. diameter) orifices were opened on five cars adjacent to Car 70, preventing the

development of brake cylinder pressure on those cars, while normal pressures were developed in the remainder of the cylinders.

That this intended brake cylinder leakage did not influence the pressure in the brake pipe is evidenced by the fact that while Demonstration No. 6 was in progress the brake pipe leakage was determined and found to be 5 lb. in two minutes from 61 lb. pressure.



Speed and Brake Pipe Pressures on Kellysville Grade, 75-Car Train

Special Demonstration A (Requested)

BRAKE FIPE LEAKAGE CORRESPONDING TO BRAKE CYLINDER LEAKAGE OF DEMONSTRATION NO. 6, ESTABLISHED STEP BY STEP ON CARS IN REGION OF CAR 70.

No. Orifices (No. 8 Drill) Open	Brake Pipe Pressure Car 1	Brake Pipe Pressure Car 100	Brake Cylinder Pressure Car 100
None	69	66*	
1	69	60	†
2	66	47	46
3	65	41	46
4	64	30	45

*Lack of time prevented waiting for complete recharge of train.
†Not observed. (10 lb. reduction of Demonstration No. 1 gave 25 lb. cylinder pressure on last car.)
The value of a No. 8 drill orifice is 48 cu. ft. of free air per minute from 70 lb.

Special Demonstration B (Requested)

Quick Action Time on 100-Car Train

Total Length of Brake Pipe (Less Branch Pipes and Engine and Tender)—5,837 Ft.

Time from movement of brake valve handle to piston start on Car 100, 10.7 sec.; rate of emergency propagation, 545 ft. per sec., or 372 m.p.h.

Speed and Air Consumption with 100-Car Train

The speed and brake pipe pressure as recorded on the 100-car train are reproduced herewith. Briefly the record shows the following for the descent of Kellysville and Allegheny grades:

	Length of 1½ per cent grades	Average Speed
Summit to Kellysville	10.5 miles	20.6 m. p. h.
Merrimac to Fagg	7 miles	19.0 m. p. h.

The speed down the grade ranged from 18 to 24 m. p. h., except for a reduction to 14 m. p. h. at Oakvale. The air consumption per car was .328 cu. ft. of free air per minute.

The train performance down the Allegheny grade from Merrimac to Fagg was a duplicate of the run down the Kellysville grade. At no time did the speed range exceed a 5 m. p. h. variation from the desired mean speed of 20 m. p. h. The air consumption was .304 cu. ft. of free air per minute per car.

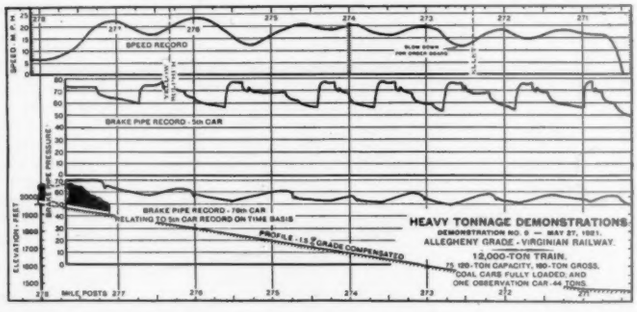
Demonstration With 75-Car Train

The concluding run of the demonstration was made on May 27, from Princeton to Roanoke, as mentioned in the issue of that date, with a train of 75 loaded 120-ton capacity cars and the observation car. The gross weight with the locomotive was 12,519 tons; without the locomotive 12,070 tons. As on previous occasions, a brake pipe pressure of 75 lb. was maintained.

Five cars in the train (15th, 30th, 45th, 60th and 74th) had open drain cocks in the cylinders. The speed fluctuations did not exceed 5 m. p. h. for any brake cycle except on the observance of a 10 m. p. h. slow order at one point a short distance east of the summit. The average speed down the Kellysville grade was 17.6 m. p. h. and from Merrimac to Fagg 19.2 m. p. h. The air consumption was 1.112 cu. ft. of free air per minute per car.

Just east of Rich Creek station, on a .9 per cent descending grade, an emergency stop was made from a speed of about 27 m. p. h. As measured by rail lengths, the stop distance was 760 ft. The slack was stretched prior to the emergency brake application and the run-in was even milder than that of the preceding day's test.

With a view of making this test under more critical conditions, a repeat at about 13 m. p. h. was made just east of McCoy station on an ascending grade of .2 per cent. The slack run-in at the rear end came just at the stop, and while more noticeable than in the first test, was very mild, being insufficient to move a camera in a leather case acting as an improvised slidometer on a planed board bench. The stop distance according to rail lengths was 230 ft.



Speed and Brake Pipe Pressures on Allegheny Grade, 75-Car Train

The train was handled between Merrimac and Fagg with the same uniform control as on Kellysville grade, including a slow down for orders at Elliott, with a total variation of speed of from 13 m. p. h. to 23 m. p. h.

The train arrived at Roanoke at 3:10 p. m., a total of 8½ hours elapsed time, showing the practicability of handling a 12,000-ton train in regular traffic in reasonably close to an eight-hour period. The air consumption per car was .97 cu. ft. of free air per minute.

General News Department

The Railway Fire Protection Association will hold its annual meeting at Hotel Sherman, Chicago, on Monday, Tuesday and Wednesday, October 18, 19 and 20.

The convention of the American Railway Tool Foremen's Association which was to have been held at the Hotel Sherman, Chicago, on August 9, 10 and 11, has been postponed.

The convention of the International Railroad Master Blacksmiths' Association which was to have been held at the Hotel Sherman, Chicago, on August 16, 17 and 18, has been postponed.

The Interstate Commerce Commission has announced a hearing at Norfolk, Va., on June 21 with reference to the cost of locomotive equipment of the Seaboard Air Line repaired in outside shops.

Z. J. Fury, of the division of conciliation of the Federal Department of Labor, is attempting to effect a settlement of the threatened strike of the Pullman Company employees at Chicago. Mr. Fury intervenes for the federal government and strike ballots sent to 80 cities have been recalled.

The Midland Valley Railroad, about 300 miles long, from Fort Smith, Ark., northwest to Wichita, Kan., is installing Western Electric telephones for use on its train dispatching line throughout the length of the road. The dispatcher's office is at Muskogee, Okla., and there are 37 stations.

On the night of June 10 six pouches of registered mail were seized at Arion, Iowa, while awaiting transfer to the Chicago & North Western train No. 26, a fast mail train to Chicago, when three bandits overpowered the telegraph operator and escaped with the pouches in an automobile.

The Baltimore & Ohio has consolidated the Ohio river and the Wheeling divisions, making Wheeling, W. Va., the headquarters and discontinuing the offices at Parkersburg. On the Indiana division, Seymour, Ind., has been abandoned as a freight terminal and North Vernon is to be the terminal instead.

American Station, Cal., on the Southern Pacific, 70 miles east of Sacramento, has been made a regular stop for the through overland trains, in order to enable passengers to view the American river from an observation platform which has been erected at that point. The river is hundreds of feet below the railroad in a vast canyon.

The new classification of railroad employees and rules for reporting their number and compensation announced some time ago by the Railroad Labor Board has been completed and issued in book form to the carriers. The employees are divided into approximately 148 classes, which in turn have been subdivided so that there are approximately 500 distinctive classes created.

The South Eastern Express Company, operating on the Southern Railway Company, has filed with the Interstate Commerce Commission a complaint that the American Railway Express Company has closed expeditious and well established routes and denied to the South Eastern Company joint rates, thus forcing shippers to pay combination rates in order to avail themselves of the services of the South Eastern Company.

For the accommodation of delegates to the convention of the American Society for Testing Materials, which will be held in Asbury Park, N. J., on June 20 to 24 inclusive, the Pennsylvania will operate a solid Pullman train, in case there are sufficient number of reservations to warrant, leaving Chicago at 10:15 a. m. Sunday, June 19, and running direct to Asbury Park without change, arriving there at 10 a. m. Monday, June 20.

The Supreme Court of the United States has given permission to the attorney general of Texas to file an original suit attacking the constitutionality of the transportation act, particularly the rate-making and labor provisions. The state authorities asked that all acts and orders of the Labor Board and of the Interstate Commerce Commission taken under the authority of the new law be declared invalid and that if any section of the act be held constitutional the remaining sections be declared invalid.

The Newfoundland Railroad (Reid Newfoundland Company, Limited) is to be returned to its owner, the Railway Commission, consisting of three members appointed by the cabinet and three by the Reid-Newfoundland Company, having decided that on June 30 government operation shall be terminated. The company sustained a loss of nearly $1,400,000 in its operation of the system for the year ended in June, 1920, and it is estimated that the loss for the current year under government control will be greater. Officers of the company declare it impossible to operate the railway under present conditions without substantial financial help from the colony, but they have made no announcement of future plans.

Postal inspectors at Chicago have made arrests which they claim will clear up the recent theft from the Dearborn station of a registered mail sack containing some $350,000 in securities and cash, and the $100,000 station robbery at Pullman (Chicago) last August. The arrests followed information given out by a railroad mail clerk on the Monon following his arrest on information furnished by a clerk who had become suspicious of the man's actions following the robbery. From time to time the inspectors have recovered securities contained in the loot when "fences" sought to convert them into cash, and on June 13 $98,600 in Liberty Bonds and $14,300 in cash were recovered following the arrests.

The average cost of freight train operation per freight train mile based on certain selected accounts for the month of March, according to the monthly bulletin of the Interstate Commerce Commission, was $1.97 as compared with $1.78 in March, 1920. The cost, however, was less than that for February, when the average was $2.11. Practically every item included in the bulletin shows an increase as compared with 1920, but the wages of enginemen averaged 25.9 cents as compared with 27.1 cents in March, 1920, and 27 cents in February, 1921. The average of selected accounts in passenger train service was $1.07 as compared with 96 cents in March, 1920, and $1.14 in February, 1921.

Cape Cod Canal

The Secretary of War has recommended to Congress the purchase by the government of the Cape Cod Canal for $11,500,000, a price agreed upon by the canal company and the department, which is approximately $5,000,000 less than the valuation which was allowed by a federal court jury at Boston in condemnation proceedings instituted by the government. Secretary Weeks says that the canal is the busiest inter-coastal waterway of the world. It has more traffic than the Suez Canal and is regarded as one of the chief arteries of commerce in New England. It likewise has great military and naval potentialities. Under the Rivers and Harbors act passed by Congress in 1917, the advisability of the purchase of the canal was approved by the Secretary of War and he entered into negotiations for its purchase, but not being able to agree on a price condemnation proceedings were instituted by the Attorney General. Six hundred acres of land owned by the construction company is included in the proposed purchase.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structure.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operations.	Operating income (or loss).	Net after rentals.	Increase (or decr.) comp. with last year.
Alabama & Vicksburg	April	141	$161,334	$51,198	$234,700	$41,495	$40,799	$7,863	$126,672	$12,782	$233,076	99.31	$1,624	—$22,242	—$22,700	—$84,786
	4 mos.	141	784,803	233,313	1,094,100	234,617	264,875	33,382	516,026	48,976	1,108,603	101.33	—14,503	—77,220	—59,705	—273,422
Vicksburg, Shreveport & Pacific	April	171	218,916	86,338	327,981	53,519	79,548	10,086	141,560	15,044	302,845	92.34	25,136	8,461	—1,836	—92,546
	4 mos.	171	938,998	342,427	1,363,503	238,397	351,443	40,332	576,001	57,135	1,275,254	93.53	88,248	30,135	—15,295	—395,467
Ann Arbor	April	293	300,153	49,581	363,502	45,095	93,606	9,078	173,881	14,365	336,037	92.57	27,465	7,041	1,416	149,708
	4 mos.	293	1,201,291	205,589	1,487,401	178,291	363,584	34,904	757,790	58,995	1,393,590	93.69	93,811	17,955	—27,005	199,537
Atchison, Topeka & Santa Fe	April	8,828	10,025,069	3,588,754	14,725,944	645,026	3,655,656	242,524	5,963,278	424,014	10,897,165	74.00	3,828,779	2,969,146	3,108,905	1,480,119
	4 mos.	8,828	38,775,650	16,185,928	59,130,947	9,716,231	14,047,553	1,062,297	24,124,409	1,543,759	50,342,734	85.14	8,788,213	5,368,673	5,299,008	—10,035,008
Gulf, Colorado & Santa Fe	April	1,907	1,675,178	352,777	2,119,234	107,474	513,715	40,526	814,929	75,315	1,539,588	72.65	579,645	504,784	451,803	533,261
	4 mos.	1,907	7,229,310	1,534,668	9,120,159	2,294,125	2,154,431	166,972	3,593,026	295,777	8,489,246	93.08	630,914	329,446	37,480	—371,908
Panhandle & Santa Fe	April	857	563,514	116,263	717,454	—63,598	249,977	6,427	280,385	22,743	501,927	69.96	215,527	197,056	165,263	286,975
	4 mos.	857	2,167,248	495,029	2,794,499	696,267	776,345	28,321	1,078,726	93,083	2,677,336	95.81	117,163	43,647	—113,477	251,198
Atlanta & West Point	April	93	99,164	72,205	199,723	25,212	45,371	8,308	85,998	12,535	181,066	90.66	18,657	3,140	5,113	—40,941
	4 mos.	93	403,900	331,306	841,133	113,898	197,238	31,078	356,826	47,493	763,044	90.72	78,088	16,022	12,935	—196,813
Western Ry. of Alabama	April	133	108,426	68,195	199,279	27,980	56,988	7,788	76,760	11,371	184,101	92.38	15,178	6,377	12,671	—26,192
	4 mos.	133	415,015	297,447	794,681	116,186	230,006	30,467	326,345	43,543	760,464	95.69	34,216	—985	14,351	—182,455
Atlanta, Birmingham & Atlantic	April	639	142,824	22,913	182,614	82,569	107,556	19,163	153,555	12,798	375,688	205.73	—193,074	—211,239	—212,792	—69,213
	4 mos.	639	723,935	163,053	990,157	307,995	391,600	87,373	738,848	64,403	1,590,768	160.66	—600,610	—673,984	—650,999	—98,154
Atlantic Coast Line	April	4,887	4,464,972	1,518,409	6,439,300	783,698	1,226,168	96,825	2,937,298	152,873	5,232,159	81.25	1,207,140	930,768	763,572	285,280
	4 mos.	4,888	17,101,180	7,465,884	26,326,273	3,459,319	5,227,566	410,585	11,985,624	594,992	21,861,331	83.04	4,464,942	3,408,702	2,821,049	—771,491
Charleston & Western Carolina	April	342	279,313	38,965	336,918	60,904	71,844	5,702	161,119	6,259	305,828	90.77	31,091	21,035	4,554	48,662
	4 mos.	342	942,461	172,157	1,178,471	258,633	302,518	27,316	628,098	28,209	1,244,774	105.63	—66,303	—106,500	—132,067	—22,094
Baltimore & Ohio	April	5,184	12,564,902	2,314,960	15,953,279	1,660,202	3,168,965	258,046	7,012,930	575,500	12,805,634	80.27	3,147,645	2,564,509	2,337,998	2,277,694
	4 mos.	5,184	50,594,166	9,776,925	64,192,189	6,120,368	14,642,529	1,077,642	30,705,621	2,241,863	55,279,754	86.12	8,912,435	6,568,802	5,623,882	6,212,601
Baltimore & Ohio Chic. Terminal	April	90	.....	.....	205,049	32,932	39,794	1,567	150,667	11,610	240,159	117.12	—35,111	—74,392	12,533	123,294
	4 mos.	90	.....	.....	819,731	107,936	162,473	6,404	577,604	61,458	931,309	113.61	—111,578	—256,131	135,338	206,435
Staten Island Rapid Transit	April	23	85,125	96,504	199,991	29,342	28,771	1,372	126,137	13,785	199,407	99.71	585	—12,275	—22,847	50,518
	4 mos.	23	341,067	358,775	766,797	137,627	140,550	6,337	517,355	53,710	855,579	111.58	—88,782	—138,847	—185,089	54,434
Bangor & Aroostook	April	659	532,858	89,526	639,845	131,883	167,867	4,847	209,620	22,285	542,342	84.76	97,504	59,771	63,322	—190,663
	4 mos.	659	2,363,763	354,965	2,803,229	526,151	715,343	16,785	1,005,515	87,831	2,375,043	84.73	428,181	277,606	296,823	68,377
Belt Ry. Co. of Chicago	April	31	.....	.....	369,761	48,240	46,562	972	212,685	14,950	323,410	87.48	46,291	23,240	132,659	—3,030
	4 mos.	31	.....	.....	1,630,905	152,037	215,861	4,602	944,308	46,354	1,363,164	83.58	267,741	170,825	528,952	12,839
Bessemer & Lake Erie	April	225	532,407	39,342	591,009	292,847	400,709	16,276	277,615	33,737	1,026,908	173.76	—435,899	—455,934	—403,460	—810,860
	4 mos.	225	2,847,042	173,996	3,105,624	711,829	1,757,096	62,391	1,393,606	124,869	4,068,674	131.01	—963,051	—1,032,704	—703,419	—1,828,849
Bingham & Garfield	April	35	13,242	399	14,559	19,075	5,701	1,697	8,893	4,502	39,999	274.74	—25,441	—30,792	—25,230	—52,151
	4 mos.	35	73,392	2,815	82,204	64,064	22,627	7,597	44,031	19,300	158,306	192.58	—76,101	—93,587	—55,730	—211,947
Boston & Maine	April	2,300	3,911,457	1,779,767	6,137,309	1,121,036	1,200,723	67,110	3,432,457	237,812	6,088,827	99.21	48,482	—209,284	—458,603	765,122
	4 mos.	2,300	15,130,243	7,320,323	24,431,147	4,721,904	5,784,722	253,047	14,695,953	1,069,692	26,633,443	109.01	—2,202,296	—3,218,687	—4,097,588	1,638,964
Brooklyn Eastern District Terminal	April	9	110,626	.....	117,051	8,649	26,304	135	41,965	8,136	85,190	72.78	31,861	24,973	24,973	81,983
	4 mos.	...	425,046	.....	455,083	31,836	90,918	956	178,271	29,531	331,511	72.85	123,571	96,626	96,726	310,103
Buffalo & Susquehanna R. R. Corp.	April	252	109,338	7,086	119,332	41,508	94,363	2,556	57,489	10,646	206,562	173.10	—87,230	—87,680	—53,804	—67,209
	4 mos.	252	697,791	31,960	741,218	152,472	429,822	12,833	287,475	41,422	924,024	124.66	—182,806	—196,006	—12,085	—65,706
Buffalo, Rochester & Pittsburgh	April	589	869,324	144,832	1,065,139	124,590	494,146	18,283	518,011	43,756	1,201,270	112.78	—136,131	—171,131	—166,607	—86,852
	4 mos.	589	3,943,372	635,331	4,745,648	532,351	1,635,338	76,379	2,360,595	175,011	4,790,242	100.94	—44,593	—184,830	217,109	164,375
Canadian Pacific, Lines in Maine	April	233	146,705	61,442	225,961	49,872	44,632	3,927	129,506	3,845	231,782	102.58	—5,821	—20,821	—37,644	8,944
	4 mos.	233	971,793	248,194	1,292,528	141,422	214,404	14,572	675,313	15,879	1,061,591	82.13	230,937	170,937	111,038	364,409
Carolina, Clinchfield & Ohio	April	291	565,687	40,241	618,149	97,262	143,940	24,308	180,019	24,950	470,247	76.07	147,902	117,054	157,229	—76,207
	4 mos.	291	2,143,525	169,590	2,371,424	398,483	682,501	93,514	759,249	92,399	2,025,055	85.39	346,369	224,708	569,651	—170,240
Central of Georgia	April	1,913	1,229,531	422,303	1,808,558	315,092	408,754	65,260	846,208	80,527	1,721,394	95.18	87,164	750	—7,649	—39,458
	4 mos.	1,913	4,785,991	1,940,774	7,402,062	1,263,859	1,615,847	257,190	3,587,852	318,512	7,068,728	95.50	333,335	—10,546	2,471	—534,844
Central of New Jersey	April	685	3,358,493	684,207	4,257,250	439,310	892,300	35,182	1,815,985	113,331	3,322,288	78.04	934,962	642,822	535,897	1,342,953
	4 mos.	685	12,985,554	2,712,065	16,528,650	1,517,518	3,680,033	140,795	7,665,336	456,932	13,547,557	81.96	2,981,093	1,862,604	1,901,109	4,176,031
Central Vermont	April	413	377,957	96,244	520,900	107,407	141,158	11,545	345,180	21,607	628,335	120.63	—107,435	—128,362	—140,766	7,001
	4 mos.	413	1,418,831	419,737	1,994,785	300,805	551,486	46,431	1,440,835	81,321	2,426,858	121.66	—432,073	—515,737	—529,728	117,993
Chesapeake & Ohio	April	2,543	5,252,069	943,138	6,535,995	992,338	1,425,945	68,279	2,540,992	175,745	5,229,081	80.00	1,306,914	1,073,668	930,743	385,656
	4 mos.	2,542	20,147,873	3,805,925	25,300,527	3,654,153	6,751,786	268,311	10,858,090	674,919	22,308,057	88.17	2,992,470	2,065,811	1,509,404	—1,587,711
Chicago & Alton	April	1,050	1,537,376	527,141	2,183,237	276,627	654,169	49,369	930,849	66,155	1,988,168	91.07	195,069	124,165	30,263	209,059
	4 mos.	1,050	6,669,741	2,218,512	9,431,596	1,114,372	2,835,049	204,237	4,372,718	263,228	8,829,438	93.62	602,157	283,784	—242,386	—258,873
Chicago & Eastern Illinois	April	1,130	1,472,599	373,873	1,972,446	225,683	739,173	30,188	894,529	69,392	1,970,106	99.88	2,340	—84,314	—51,054	75,946
	4 mos.	1,130	6,415,742	1,735,861	8,765,326	975,615	3,446,219	141,944	4,096,264	287,948	9,002,141	102.70	—237,815	—580,279	—409,814	—1,405,540
Chicago & Northwestern	April	8,402	6,757,225	2,685,356	10,576,218	1,576,624	3,248,726	148,847	5,711,498	380,326	11,159,260	109.61	—583,042	—1,364,481	—1,218,421	102,218
	4 mos.	8,402	29,525,601	11,657,938	45,376,246	5,372,148	12,823,363	659,733	23,950,039	1,526,010	44,710,832	98.53	665,413	—2,460,182	—2,479,758	—449,995
Chicago, Burlington & Quincy	April	9,393	9,158,254	2,335,328	12,639,378	1,718,929	2,618,183	212,875	5,338,011	435,173	10,443,026	82.62	2,196,353	1,377,175	1,239,804	2,399,276
	4 mos.	9,391	38,060,048	10,159,686	52,519,129	4,957,969	11,055,272	749,586	22,846,687	1,704,227	41,827,509	79.64	10,691,620	7,467,312	6,578,052	1,474,051
Chicago Great Western	April	1,496	1,289,545	371,868	1,811,617	304,103	372,139	64,161	879,293	62,956	1,698,530	93.76	113,087	41,836	—90,894	—305,436
	4 mos.	1,496	5,489,783	1,672,225	7,721,083	839,704	1,918,380	269,008	3,643,724	257,740	6,993,323	90.57	727,761	419,587	56,088	443,906
Chicago, Indianapolis & Louisville	April	657	832,246	765,897	1,198,189	144,235	351,203	31,093	483,164	39,126	1,061,579	88.60	136,610	70,363	—16,524	164,3
	4 mos.	657	3,329,112	1,046,334	4,785,130	490,333	1,347,545	127,914	2,100,762	146,659	4,272,338	89.28	512,792	287,286	—46,976	117
Chicago Junction	April	13	.....	.....	397,441	46,306	33,761	82	184,223	14,172	278,543	70.08	118,898	94,525	165,547	37
	4 mos.	13	.....	.....	1,633,157	223,976	176,575	681	815,571	59,291	1,276,094	78.14	357,063	259,788	546,294	

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Maintenance of: Way and structure.	Equipment.	Operating expenses: Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operations.	Operating income (or loss).	Net after rentals	Increase (or decr.) comp. with last year.
Chicago, Mil. & St. Paul	April	10,621	$7,442,771	$2,075,695	$10,621,048	$1,664,319	$2,471,786	$189,794	$5,556,298	$396,106	$10,337,167	97.33	$283,881	—$465,340	—$718,920	$240,100
	4 mos.	10,614	31,264,986	8,821,730	44,356,630	4,837,768	12,308,239	698,589	23,698,322	1,618,728	43,408,507	97.86	948,123	—1,971,714	—3,191,556	1,533,628
Chicago, Feoria & St. Louis	April	247	118,115	22,553	147,793	32,150	47,806	4,699	103,155	11,735	199,546	135.02	—51,753	—62,413	—66,758	41,983
	4 mos.	247	519,036	105,444	655,812	125,431	255,805	19,677	449,108	47,903	897,924	136.92	—242,112	—277,809	—276,264	—107,942
Chicago, Rock Island & Pacific	April	7,662	7,028,833	2,239,800	9,919,611	1,317,544	2,279,769	182,068	4,371,814	252,665	8,447,954	85.16	1,471,657	1,036,211	786,795	1,382,090
	4 mos.	7,662	28,572,537	9,606,590	41,016,938	5,433,268	9,106,266	694,076	18,754,092	1,049,114	35,221,900	85.87	5,795,038	4,069,169	2,766,262	559,961
Chicago, St. Paul, Minn. & Omaha	April	1,749	1,399,268	542,535	2,087,078	2,3,593	528,869	37,107	1,146,885	90,325	2,087,392	100.02	—314	—147,017	—204,151	—463,546
	4 mos.	1,749	6,090,429	2,363,207	8,974,548	903,845	2,314,297	145,267	4,976,081	339,585	8,725,408	97.22	249,140	—302,932	—468,419	—1,645,597
Chicago, Terre Haute & So'eastern	April	374	357,237	23,697	393,370	59,753	159,673	4,135	157,342	12,922	394,964	100.41	—1,594	—24,094	15,598	71,911
	4 mos.	374	1,441,384	105,326	1,605,106	253,437	682,333	26,032	710,938	50,971	1,729,225	107.73	—124,120	—208,183	—103,287	—288,752
Chicago, Indianapolis & Western	April	322	219,411	52,302	286,516	82,280	90,299	10,464	161,254	18,881	365,138	127.44	—78,622	—93,053	—106,386	5,849
	4 mos.	322	823,044	226,135	1,115,644	200,601	348,566	48,553	624,377	90,762	1,323,859	118.66	—208,215	—271,266	—292,267	40,293
Colorado & Southern	April	1,099	759,110	179,431	1,003,517	80,215	235,074	13,549	380,707	53,128	769,527	76.68	233,990	157,994	178,835	—76,705
	4 mos.	1,099	3,374,622	727,576	4,391,234	391,382	1,150,820	47,693	1,621,209	216,303	3,455,770	78.70	935,464	620,998	738,674	—280,843
Fort Worth & Denver City	April	454	627,980	191,290	883,264	90,848	161,732	10,997	312,750	39,344	620,820	70.29	262,444	235,061	245,833	239,130
	4 mos.	454	2,579,904	854,600	3,626,499	330,835	736,105	45,206	1,405,579	153,829	2,697,767	74.39	928,732	810,967	859,080	753,075
Wichita Valley	April	256	96,901	25,665	134,116	26,729	15,347	35	70,199	1,844	114,154	85.12	19,962	12,774	2,764	14,308
	4 mos.	256	437,956	114,418	584,098	123,423	40,018	120	268,546	6,704	438,404	75.06	145,694	121,917	76,342	—12,970
Columbus & Greenville	April	278	68,564	23,821	98,571	41,525	17,455	3,668	73,128	6,900	142,677	144.75	—44,106	—57,519	—77,371	—10,877
	4 mos.	278	403,891	122,802	560,837	169,703	92,768	14,621	332,740	26,342	636,173	113.43	—75,337	—128,500	—226,809	—100,042
Delaware & Hudson	April	880	3,280,271	281,754	3,713,598	322,426	931,453	38,041	1,467,436	172,511	2,945,961	79.33	767,637	688,034	737,815	555,779
	4 mos.	880	13,248,809	1,174,499	15,023,123	1,637,233	4,415,823	159,091	6,742,367	662,547	13,686,039	91.10	1,337,083	1,014,566	1,146,530	1,733,529
Delaware, Lack. & West	April	997	5,438,923	1,099,830	7,188,206	813,358	1,676,088	100,804	2,971,406	191,291	5,805,681	80.77	1,382,524	1,002,389	1,075,265	1,391,183
	4 mos.	997	20,506,831	4,409,708	27,419,150	2,749,193	6,999,913	416,440	12,794,363	734,629	23,916,092	87.22	3,503,058	1,982,402	2,227,320	1,922,221
Denver & Rio Grande	April	2,593	1,601,419	448,777	2,225,979	278,137	425,770	38,465	834,475	80,423	1,701,903	76.46	524,077	372,292	428,960	204,106
	4 mos.	2,589	7,425,964	1,868,235	9,991,686	1,124,584	2,698,173	164,429	3,707,068	341,356	8,215,851	82.23	1,775,835	1,189,471	1,448,885	—994,805
Denver & Salt Lake	April	255	67,097	17,959	95,299	54,220	51,758	774	55,462	6,520	168,734	177.06	—73,435	—81,435	—78,286	114,279
	4 mos.	255	545,702	78,411	662,744	183,586	290,437	3,552	359,045	28,296	864,916	130.51	—202,172	—234,288	—222,389	361,969
Detroit & Mackinac	April	375	117,684	32,630	158,159	29,585	49,309	2,759	72,488	6,684	160,790	101.66	—2,631	—11,854	—10,333	—14,671
	4 mos.	375	401,151	130,468	569,068	95,048	188,159	11,043	290,588	28,009	612,689	107.67	—43,621	—80,730	—58,750	—8,499
Detroit & Toledo Shore Line	April	61	138,360	.....	142,217	46,805	47,593	2,868	69,325	5,644	172,236	121.11	—30,019	—44,019	—79,926	—119,346
	4 mos.	61	728,759	.....	744,490	108,099	148,850	11,559	262,416	26,398	557,323	74.86	187,168	139,168	11,484	61,800
Detroit, Toledo & Ironton	April	455	674,692	13,641	697,491	97,088	87,626	7,593	183,832	19,745	395,816	56.75	301,675	291,905	276,452	375,926
	4 mos.	455	1,473,511	58,870	1,575,140	351,766	324,843	28,134	639,994	69,843	1,413,885	89.76	161,255	121,883	43,066	125,826
Duluth & Iron Range	April	291	134,323	23,175	178,253	81,436	119,209	2,314	134,435	22,317	360,452	202.21	—182,199	—193,161	—187,885	—48,109
	4 mos.	291	663,999	118,432	885,331	296,972	514,547	6,800	706,600	86,457	1,613,746	182.28	—728,415	—787,521	—808,803	—207,719
Duluth, Missabe & Northern	April	406	154,619	55,976	237,145	252,052	199,573	3,842	188,150	27,402	672,963	283.78	—435,818	—451,022	—451,041	—305,948
	4 mos.	406	543,081	230.234	884,796	740,005	850,109	12,468	778,414	91,487	2,480,304	280.32	—1,595,507	—1,655,370	—1,662,325	—575,544
Duluth, South Shore & Atlantic	April	591	178,322	101,508	311,508	67,373	87,350	6,926	199,154	13,326	380,493	122.15	—68,985	—95,985	—108,642	—145,549
	4 mos.	591	1,008,654	399,778	1,528,137	170,558	406,326	29,112	925,444	52,421	1,614,968	105.68	—86,831	—216,927	—275,047	—40,831
Duluth, Winnipeg & Pacific	April	179	161,901	28,312	193,702	28,517	67,246	7,188	100,588	10,577	214,116	110.54	—20,414	—30,099	—32,653	—43,629
	4 mos.	179	951,795	154,448	1,131,021	113,936	227,619	23,238	551,020	49,248	965,061	85.33	165,960	109,115	104,042	33,864
Elgin, Joliet & Eastern	April	836	1,216,294	16	1,324,356	171,569	567,832	12,544	487,168	41,715	1,280,732	96.71	43,624	—23,538	—155,695	—41,619
	4 mos.	836	7,001,736	36	7,736,954	701,517	2,181,506	54,213	2,682,706	169,278	5,788,766	74.82	1,948,188	1,640,839	1,039,403	490,644
El Paso & Southwestern	April	1,027	696,085	194,731	935,142	192,460	203,043	27,799	296,892	55,154	785,056	83.95	150,086	61,739	38,556	—132,926
	4 mos.	1,027	2,992,893	879,111	4,083,501	940,913	963,249	120,181	1,290,789	212,734	3,570,862	87.45	512,638	126,928	80,162	—1,040,764
Erie R. R.	April	1,989	6,462,706	1,109,482	8,118,194	823,187	2,268,306	114,621	3,652,694	312,604	7,214,140	88.86	904,054	611,719	809,963	3,306,158
	4 mos.	1,989	26,347,432	4,520,502	33,012,382	3,341,484	10,696,506	508,506	16,369,493	1,265,155	32,361,294	98.03	651,088	—496,528	643,863	4,931,317
Chicago & Erie	April	270	756,815	66,637	879,624	100,143	155,643	18,089	460,731	41,856	776,083	88.23	103,541	59,787	—328,866	237,821
	4 mos.	270	3,080,939	267,664	3,564,874	423,304	669,129	76,248	2,227,963	170,019	3,566,476	100.04	—1,602	—176,612	—1,605,200	—266,709
New Jersey & New York	April	48	23,442	97,083	123,600	7,860	20,003	827	71,724	2,447	102,858	83.22	20,742	17,823	—9,684	19,727
	4 mos.	48	71,342	379,804	463,988	46,494	81,520	6,429	294,000	10,284	438,724	94.56	25,259	13,584	—92,232	6,932
New York, Susq. & West	April	136	218,460	61,239	325,220	41,666	44,479	2,814	216,013	10,673	315,645	97.06	9,575	—16,298	—14,843	54,387
	4 mos.	136	935,006	253,633	1,367,220	187,413	217,265	15,187	998,670	40,243	1,458,772	106.70	—91,552	—195,132	—172,766	282,631
Florida East Coast	April	764	888,444	354,213	1,431,162	235,987	218,974	12,319	492,091	31,002	1,013,856	70.84	417,306	369,683	317,210	74,187
	4 mos.	764	3,368,721	2,148,510	6,262,452	892,315	890,344	69,326	2,144,199	119,155	4,203,987	67.13	2,058,465	1,867,793	1,679,482	60,971
Fort Smith & Western	April	253	114,085	24,065	176,075	74,561	35,161	5,348	69,793	8,004	195,230	110.88	—19,156	—24,787	—29,449	—23,384
	4 mos.	253	480,653	106,472	658,144	180 862	169,963	21,503	280.890	32,533	695,137	105.62	—36,994	—59,612	—75.720	—35,614
Georgia Railroad	April	328	347,739	103.404	476.474	47,982	118,214	21.627	246,499	21,325	455,855	95.67	20,618	14,666	10,903	—14,272
	4 mos.	328	1,233.811	456,821	1,815,522	209,794	490,263	83,043	1,007,293	83,176	1,874.378	103.24	—58.856	—82,824	—65,617	—163,692
Georgia & Florida	April	405	93.497	15 948	120 063	26,811	17 789	7,941	60,663	7,433	120,637	100 48	—573	—8,531	—9,113	63,553
	4 mos.	405	352,478	72.455	462,026	117,647	78,559	29.959	244,861	33.638	504.664	109.23	—42,638	—74,017	—93,375	228,783
Grand Trunk Western	April	352	897,098	197,014	1,164,990	97,378	264,883	35,103	594,189	54.377	1,049,325	90.07	115,665	64.086	—12.623	406,357
	4 mos.	352	3.284 395	757.298	4,302,660	487,993	945.554	148,713	2,425,791	299,043	4,332,495	100.69	—29,836	—236,890	—837.151	—126,459
Atlantic & St. Lawrence	April	166	138.224	40,744	189.864	35.469	59,976	2.963	109,453	12.156	222.061	116.96	—32.197	—52,524	—121.382	—18.789
	4 mos.	166	933,614	172.588	1,168.872	191,547	258.467	12,720	691,135	58,783	1,214.793	103.93	—45,921	—123,861	—439,561	88,933
Chic., Det. & Can. Gran Trunk	April	62	108,231	12,456	113,206	9,127	17,836	2,664	66,754	4,158	100.659	88.92	12,548	7,563	—7,494	40,029
	4 mos.	62	594.395	56.067	685,326	51,654	72,056	11.325	297,250	22.596	455.386	66.48	229,659	210,847	133,098	135,004
Det., Grand Haven & Milwaukee	April	194	127,449	54.517	197,673	38,350	62,589	10.855	234,720	16,786	363,783	184.03	—166.109	—176,592	—220,546	—108,184
	4 mos.	194	879.525	188,987	1,155,202	180,119	208,812	40.570	858,539	82,688	1,372,655	118.82	—217,453	—237,930	—431,781	—10,918
Great Northern	April	8,163	4,917,134	1,248,971	6,926,485	1,432,312	1,473,813	136,705	3,126,323	277,696	6,444,356	93.04	482,129	—186,481	—68,259	—719,162
	4 mos.	8,167	18,063,722	5,271,672	26,139,940	4,166,398	6,611,390	558,381	13,495,409	1,011,353	25,931,320	99.20	208,620	—3,086,230	—2,978,489	—3,125,434

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of—Way and structure.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operations.	Operating income (or loss).	Net after rentals.	Increase (or decr.) comp. with last year.
Green Bay & Western	April	252	$93,242	$17,312	$115,897	$19,021	$24,553	$1,785	$43,655	$2,779	$91,791	79.21	$24,106	$17,106	$15,756	$30,819
	4 mos.	252	366,582	81,783	481,698	60,620	112,125	7,685	190,146	14,238	384,807	79.89	96,892	68,683	59,762	32,433
Gulf & Ship Island	April	307	163,950	37,280	220,286	49,071	49,322	6,006	87,357	16,954	209,065	94.91	11,221	—7,969	—9,527	—675
	4 mos.	307	689,329	175,470	930,500	182,067	190,122	29,974	373,898	56,317	833,872	89.29	96,627	18,647	35,933	73,110
Gulf, Mobile & Northern	April	463	289,165	39,601	343,046	49,198	76,314	13,291	144,748	15,202	298,754	87.09	44,292	29,611	20,698	14,582
	4 mos.	463	1,172,591	181,638	1,414,481	264,139	299,108	48,665	664,239	66,122	1,342,272	94.90	72,209	13,467	—6,019	43,246
Hocking Valley	April	350	870,931	96,492	1,021,213	131,632	424,555	11,737	370,941	36,338	975,201	95.49	46,013	—39,078	—44,251	—74,992
	4 mos.	350	2,949,601	432,614	3,557,272	547,049	1,832,698	45,650	1,501,061	146,374	4,071,842	114.47	—514,570	—856,698	—635,224	—1,267,353
Illinois Central	April	4,799	8,739,872	1,912,311	11,409,154	1,775,442	2,609,939	142,462	4,499,276	330,586	9,437,392	82.72	1,971,562	1,332,145	1,408,203	1,812,640
	4 mos.	4,799	34,980,391	8,414,457	46,453,346	6,102,297	9,742,566	624,168	19,479,648	1,261,846	37,492,547	80.71	8,960,799	6,212,601	6,766,896	1,899,862
Yazoo & Mississippi Valley	April	1,381	1,239,575	323,157	1,643,842	357,277	343,910	23,455	749,970	54,676	1,530,693	93.12	113,149	7,823	—2,809	346,591
	4 mos	1,381	5,145,153	1,444,323	6,980,159	1,306,198	1,344,136	105,301	3,225,977	232,889	6,225,151	89.18	755,008	333,330	312,226	—52,578
International & Great Northern	April	1,159	1,222,468	228,276	1,571,254	229,063	253,397	25,452	825,837	54,345	1,395,647	88.82	175,607	145,068	25,281	633,345
	4 mos.	1,159	4,675,208	1,030,301	6,228,610	914,080	1,274,403	102,323	3,551,891	219,278	6,098,304	97.91	130,306	2,620	—508,830	513,475
Kansas City, Mexico & Orient	April	272	111,924	10,445	130,731	33,680	56,475	7,042	86,451	12,656	196,304	150.16	—65,573	—73,615	—72,366	—21,979
	4 mos.	272	466,041	48,477	549,723	127,208	197,765	22,740	305,809	52,050	705,573	128.35	—155,850	—188,042	—163,724	65,023
Kan. City, Mex. & Orient of Tex.	April	465	169,180	13,708	188,879	52,728	62,056	7,196	141,289	5,865	269,134	142.49	—80,255	—86,405	—105,481	46,404
	4 mos.	465	583,856	70,597	680,579	194,365	222,522	23,536	454,394	27,313	922,129	135.49	—241,550	—266,175	—321,096	—31,895
Kansas City Southern	April	779	1,409,090	188,577	1,690,792	212,399	311,102	43,466	607,427	76,781	1,249,765	73.92	441,027	363,898	349,481	297,528
	4 mos.	779	5,497,936	771,610	6,701,213	783,034	1,139,541	158,642	2,550,529	292,972	4,918,815	73.40	1,782,398	1,473,431	1,424,582	868,374
Texarkana & Fort Smith	April	93	134,835	18,072	175,143	21,685	28,422	6,205	58,620	90.24	123,686	70.62	51,457	44,082	16,102	—19,526
	4 mos.	93	632,914	74,194	770,366	70,774	81,918	19,497	294,261	32,058	497,526	64.58	272,840	243,375	113,050	—74,920
Kansas City Terminal	April	27	.....	.....	133,148	14,769	22,183	.....	55,756	5,096	100,470	75.46	32,677	6,164	212,771	59,869
	4 mos.	27	.....	.....	534,707	52,462	86,151	.....	231,335	14,222	395,153	73.90	139,553	33,305	898,360	210,656
Kansas, Oklahoma & Gulf	April	314	134,928	16,995	158,368	48,437	29,678	4,067	83,626	12,469	178,451	112.68	—20,083	—28,579	—32,888	—23,254
	4 mos.	325	726,439	77,616	850,252	211,768	179,151	17,342	385,132	45,471	839,697	98.76	10,555	—23,491	—74,506	123,304
Lake Superior & Ishpeming	April	33	2,496	271	3,622	15,456	16,356	407	9,197	3,115	44,531	1,229.46	—40,909	—46,268	—46,210	—2,350
	4 mos.	33	22,294	1,223	28,300	74,519	86,303	1,151	42,131	15,229	219,333	775.03	—191,033	—212,730	—210,788	—10,739
Lake Terminal R. R.	April	13	.....	.....	98,652	15,634	25,671	.....	56,897	284	98,486	99.83	166	—5,821	—4,617	36,219
	4 mos.	13	.....	.....	502,649	78,712	112,530	.....	302,058	653	493,953	98.27	8,696	—15,557	—14,971	84,004
Lehigh & Hudson River	April	96	254,833	3,839	268,260	24,666	39,034	1,782	110,378	7,412	183,272	68.32	84,987	72,836	49,691	76,964
	4 mos.	96	1,011,079	16,611	1,064,187	107,325	200,696	8,658	486,661	32,011	835,350	78.50	228,837	180,229	91,884	241,392
Lehigh & New England	April	237	383,570	2,034	396,265	38,295	92,436	5,917	135,273	20,709	290,599	73.33	105,666	90,213	108,990	106,352
	4 mos.	237	1,328,711	8,777	1,384,110	150,780	324,675	19,002	549,959	69,796	1,113,737	80.47	270,374	208,562	285,424	132,385
Lehigh Valley	April	1,448	5,259,490	605,413	6,289,659	571,460	2,713,046	96,501	2,649,455	150,910	6,203,626	98.63	86,033	—65,563	—64,327	1,209,651
	4 mos.	1,448	19,824,429	2,373,980	23,912,904	2,343,431	9,889,397	415,959	11,426,702	585,785	24,752,461	103.51	—839,557	—1,662,302	—1,540,069	1,937,832
Los Angeles & Salt Lake	April	1,168	1,151,485	400,020	1,681,286	366,156	339,770	48,514	562,364	42,289	1,401,719	83.37	279,567	187,831	147,556	179,657
	4 mos.	1,168	4,176,341	1,939,005	6,641,932	1,397,605	1,373,952	213,892	2,415,696	154,285	5,735,783	86.36	906,149	528,546	365,802	—647,820
Louisiana & Arkansas	April	302	219,591	33,955	260,184	52,569	60,708	5,827	96,786	9,653	225,463	86.66	34,721	19,230	8,309	—51,680
	4 mos.	302	952,146	140,114	1,129,295	232,030	260,170	24,097	437,884	37,766	990,206	87.68	139,089	71,887	42,081	—335,427
Louisiana Ry. & Nav. Co.	April	343	243,182	36,803	296,871	56,256	37,083	9,471	112,164	12,371	227,137	76.51	69,734	53,636	43,390	27,953
	4 mos.	343	1,042,578	135,359	1,271,865	318,190	192,872	40,268	574,227	52,393	1,177,045	92.54	94,820	30,532	—41,800	—55,264
Louisville & Nashville	April	5,043	6,846,101	1,847,191	9,190,896	1,555,915	2,838,322	214,119	4,182,643	258,834	9,048,842	98.45	142,053	—162,985	—279,329	—481,891
	4 mos.	5,043	27,681,107	7,940,663	37,880,960	5,642,441	12,063,249	879,242	18,568,576	1,083,933	38,333,958	101.20	—452,998	—1,672,635	—2,225,776	—5,870,176
Louisville, Henderson & St. Louis	April	199	142,015	62,209	219,375	43,778	37,332	6,796	93,155	10,622	191,683	87.38	27,692	20,309	8,625	33,979
	4 mos.	199	621,247	240,801	956,422	187,406	153,477	27,417	379,869	38,502	786,671	82.25	169,750	140,214	81,761	—34,552
Maine Central	April	1,215	1,173,556	386,198	1,668,838	307,472	429,706	11,859	833,328	51,769	1,635,831	98.02	33,007	—69,421	—95,343	91,015
	4 mos.	1,215	5,351,660	1,528,263	7,326,975	1,396,996	2,347,898	54,734	4,085,606	215,137	8,104,079	110.61	—777,104	—1,199,622	—1,369,077	—101,960
Midland Valley	April	388	295,486	80,346	391,090	88,093	70,849	5,748	136,909	17,239	316,807	81.01	74,283	66,108	61,731	13,394
	4 mos.	388	1,166,924	341,474	1,576,031	388,106	288,764	21,547	560,658	95,352	1,352,396	85.81	223,636	190,932	171,776	59,336
Minneapolis & St. Louis	April	1,650	975,447	170,346	1,210,789	228,543	339,916	26,515	643,449	44,048	1,282,375	105.91	—71,586	—151,495	—168,362	23,187
	4 mos.	1,650	4,148,747	819,759	5,204,213	671,102	1,440,786	99,751	2,822,346	182,382	5,216,684	100.24	—12,471	—306,000	—373,718	—373,780
Minn., St. P. & Sault Ste. Marie	April	4,242	2,435,333	607,675	3,421,826	626,610	1,080,565	51,439	1,580,465	154,016	3,510,729	102.60	—88,903	—338,162	—397,780	—251,270
	4 mos.	4,242	9,474,914	2,572,930	13,012,698	2,145,404	3,953,639	210,027	7,094,473	478,061	13,963,756	107.31	—951,058	—2,158,015	—2,413,563	—2,140,815
Mississippi Central	April	164	54,841	15,364	73,636	15,465	30,139	2,364	30,541	6,128	84,636	114.94	—11,000	—17,126	—20,765	—14,757
	4 mos.	164	248,431	73,336	335,408	58,314	120,002	10,700	130,445	28,601	348,062	103.77	—12,655	—37,113	—32,022	124,104
Missouri & North Arkansas	April	364	56,593	19,845	85,205	36,467	48,280	3,621	63,760	7,369	159,494	187.19	—74,288	—78,656	—94,729	—67,929
	4 mos.	364	240,964	106,447	376,955	140,363	154,984	15,261	240,882	27,117	578,595	153.49	—201,640	—220,226	—254,909	—102,491
Missouri, Kansas & Texas	April	1,715	1,791,590	534,629	2,556,630	385,751	817,699	62,305	932,323	108,669	2,319,186	90.36	246,444	113,817	198,578	5,917
	4 mos.	1,715	7,478,350	2,453,609	10,717,955	1,385,438	3,242,679	197,955	4,021,613	424,407	9,264,769	86.44	1,453,186	990,686	1,428,971	—241,330
Missouri, Kan. & T. of Texas	April	1,739	1,462,867	516,380	2,152,853	327,675	457,600	44,531	883,772	93,596	1,819,791	84.53	333,062	278,383	51,073	677,733
	4 mos.	1,739	6,182,678	2,286,523	9,145,136	1,323,320	1,637,026	174,788	4,012,640	403,490	7,604,845	83.16	1,540,291	1,347,286	262,552	3,026,864
Wichita Falls & Northwestern	April	328	149,487	25,302	184,099	36,784	28,387	1,218	76,601	7,758	150,623	81.82	33,476	22,595	2,986	139,314
	4 mos.	328	640,248	119,943	799,121	118,149	130,179	4,040	313,121	31,563	596,831	74.69	202,291	158,651	92,027	393,182
Missouri Pacific	April	7,300	6,203,629	1,534,063	8,297,361	1,473,614	1,535,484	168,255	3,700,726	299,222	7,201,883	86.80	1,095,477	785,830	623,496	1,572,998
	4 mos.	7,300	25,691,294	6,614,914	35,165,199	5,986,344	8,086,004	697,522	16,293,195	1,201,122	32,377,323	92.07	2,787,876	1,665,110	1,100,946	66,296
Mobile & Ohio	April	1,165	1,333,736	146,742	1,558,539	211,640	405,787	49,001	623,593	55,749	1,347,096	86.43	211,432	147,408	116,650	141,402
	4 mos.	1,165	5,411,721	643,643	6,360,895	895,690	1,824,562	201,279	2,762,931	217,688	5,907,610	92.87	453,285	207,955	195,416	80,721
Monongahela	April	106	217,327	36,315	257,711	93,239	70,131	1,209	98,159	8,995	271,734	105.44	—14,022	—20,523	—60,813	—152,830
	4 mos.	106	1,116,473	150,207	1,285,415	313,845	276,352	8,509	436,763	32,646	1,068,115	83.09	217,300	191,300	—43,089	271,682

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structure.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operations.	Operating income (or loss).	Net after rentals.	Increase (or decr.) comp. with last year.
Monongahela Connecting	April	7	.....	.....	$62,590	$5,247	$9,470	$562	$32,272	$6,248	$53,798	85.95	$8,791	$7,005	$4,278	$58,037
	4 mos.	7	.....	.....	256,606	40,942	66,007	2,292	154,459	26,773	290,473	113.20	—33,867	—41,462	—60,574	—321,662
Montour R. R.	April	56	$121,214	$1,047	123,608	20,956	64,252	1,188	34,334	7,271	128,005	103.56	—4,397	—6,570	11,837	6,105
	4 mos.	56	431,027	4,795	443,499	85,237	258,055	4,721	148,723	29,548	526,335	118.68	—82,836	—93,176	19,824	24,136
Nashville, Chattanooga & St. Louis	April	1,258	1,141,053	390,519	1,641,881	353,148	548,676	77,064	822,708	64,293	1,869,967	113.89	—228,086	278,097	—228,506	—603,089
	4 mos.	1,258	4,561,175	1,728,817	6,833,573	1,253,459	2,010,336	297,721	3,511,814	230,822	7,330,333	107.27	—496,759	—697,283	—445,562	—1,108,536
Nevada Northern	April	164	9,704	8,234	22,390	12,237	6,887	762	13,608	3,685	37,179	166.05	—14,789	—24,716	—21,784	—50,578
	4 mos.	164	129,358	27,821	176,717	47,783	34,635	2,716	78,777	15,058	179,213	101.41	—2,495	—41,841	—28,330	—174,668
Newburgh & South Shore	April	7	.....	.....	84,950	9,103	22,232	.....	47,121	5,175	83,632	98.45	1,319	—8,584	—5,819	67,180
	4 mos.	7	.....	.....	446,326	43,182	114,165	.....	249,213	18,982	425,543	91.25	40,784	2,849	15,461	165,619
New Orleans, Great Northern	April	274	150,512	40,999	202,048	32,839	36,250	4,029	87,481	11,424	172,481	85.37	29,567	13,692	12,950	—19,593
	4 mos.	274	642,599	165,643	847,851	135,474	137,726	21,083	369,978	39,020	705,125	83.17	142,726	81,130	89,686	13,104
New Orleans, Texas & Mexico	April	191	163,840	32,611	213,170	40,262	47,788	6,260	64,432	6,838	162,072	76.03	51,098	33,970	26,524	50,773
	4 mos.	191	797,659	155,146	993,513	178,819	218,282	27,745	278,965	31,498	731,624	73.64	261,888	194,630	172,169	213,321
Beaumont, Sour Lake & Western	April	118	115,061	29,687	153,512	35,594	35,032	4,757	57,921	9,696	142,971	93.13	10,542	7,384	—4,981	—26,527
	4 mos.	118	670,953	133,345	834,482	165,962	120,507	20,765	261,749	34,521	603,388	72.31	231,094	218,747	168,752	77,503
St. Louis, Brownsville & Mexico	April	550	358,208	130,025	515,249	78,444	92,555	14,966	190,660	30,398	406,730	78.94	108,520	93,597	63,646	—52,871
	4 mos.	550	1,437,874	579,678	2,151,303	402,674	392,643	65,309	801,439	109,576	1,762,215	81.91	389,088	330,464	212,790	—5,135
New York Ceneral	April	6,078	15,638,893	7,334,310	25,883,001	2,692,447	5,721,375	356,400	9,950,548	828,434	19,883,297	76.82	5,999,704	4,314,934	4,099,090	2,914,541
	4 mos.	6,075	63,321,465	28,814,706	103,093,967	11,660,360	25,196,355	1,326,011	46,713,601	3,451,899	89,749,655	87.06	13,344,312	6,861,318	7,087,064	1,158,230
Cincinnati Northern	April	244	275,710	16,489	301,704	40,223	47,583	8,227	132,040	7,648	235,738	78.14	65,966	51,354	48,619	51,258
	4 mos.	245	967,488	76,521	1,082,105	161,323	235,522	24,249	477,299	30,609	928,990	88.85	153,115	94,662	78,763	—40,226
Cleveland, Cinn. Chi. & St. L.	April	2,409	4,498,024	1,317,566	6,329,240	1,041,287	1,250,149	112,527	3,005,056	174,470	5,636,402	89.05	692,838	375,512	204,517	174,902
	4 mos.	2,420	18,431,684	5,580,610	26,002,944	3,303,994	5,282,724	484,248	12,519,194	691,741	22,488,734	86.49	3,514,210	2,249,567	1,290,214	—3,454,214
Indiana Harbor Belt	April	120	.....	.....	677,344	78,500	107,898	4,245	286,139	28,526	505,308	74.60	172,036	127,154	18,424	273,598
	4 mos.	120	.....	.....	2,903,007	477,759	554,660	16,520	1,589,657	106,120	2,744,856	94.55	158,152	75,542	—324,574	512,084
Kanawha & Michigan	April	176	303,253	56,051	373,307	64,571	144,845	3,840	128,905	12,615	354,772	95.03	18,535	—17,121	14,156	64,545
	4 mos.	176	1,070,563	241,903	1,366,541	267,934	683,451	17,213	568,058	43,068	1,579,720	115.60	—213,179	—355,803	—90,848	—146,310
Lake Erie & Western	April	738	627,611	58,813	720,849	122,320	180,855	17,053	333,535	28,334	681,929	94.60	38,920	—5,954	—10,612	—19,945
	4 mos.	738	2,503,779	253,802	2,892,922	519,525	901,020	77,021	1,432,619	115,967	3,045,626	105.28	—152,704	—333,064	—322,527	241,212
Michigan Central	April	1,865	3,599,748	1,481,294	5,772,998	731,314	937,290	105,067	2,641,488	166,365	4,647,516	80.50	1,125,482	899,931	952,401	1,798,026
	4 mos.	1,865	13,755,534	6,412,014	22,267,474	2,753,085	4,499,519	395,009	10,431,537	633,686	19,000,539	85.33	3,266,935	2,362,825	2,318,211	352,851
Pittsburgh & Lake Erie	April	224	1,163,157	245,327	1,547,190	277,732	521,763	18,741	866,445	79,496	1,765,542	114.11	—218,351	—443,451	—206,082	—48,808
	4 mos.	224	6,892,359	1,082,705	8,696,999	1,430,537	2,526,029	90,061	3,805,528	319,398	8,177,405	94.03	519,593	—374,735	580,816	67,470
Toledo & Ohio Central	April	503	561,477	67,489	751,866	121,734	172,839	10,913	301,902	27,679	635,623	84.54	116,243	60,355	72,484	143,071
	4 mos.	503	2,743,582	307,525	3,164,493	500,990	794,023	46,377	1,459,902	122,527	2,934,469	92.73	230,024	6,668	176,884	15,073
New York, Chicago & St. Louis	April	574	2,073,730	115,294	2,230,890	179,641	507,602	57,549	874,333	74,891	1,698,697	76.14	532,194	436,194	460,790	294,481
	4 mos.	574	8,154,322	406,423	8,718,638	762,608	1,756,792	219,982	3,883,040	297,651	6,936,792	79.56	1,781,846	1,381,812	1,419,815	—11,279
*N. Y., New Haven & Hartford	April	1,986	4,303,504	4,005,262	9,213,041	1,204,061	2,304,744	56,966	4,742,403	356,611	8,845,478	96.01	367,563	—31,947	—327,782	598,376
	4 mos.	1,986	15,994,866	16,094,175	35,858,829	5,106,006	9,419,291	244,342	20,328,353	1,446,397	37,298,642	104.02	—1,439,813	—3,034,387	—4,319,575	73,912
Central New England	April	301	588,207	25,309	607,965	104,868	62,839	3,677	305,778	14,831	491,992	80.92	115,973	94,507	—76,024	151,573
	4 mos.	301	2,582,348	109,267	2,804,207	384,994	407,502	16,182	1,193,600	60,656	2,063,341	73.58	740,866	654,845	242,600	1,550,396
New York, Ontario & Western	April	569	676,586	140,816	968,277	122,984	290,652	12,901	472,760	36,563	935,859	96.65	32,418	—3,082	—25,043	214,310
	4 mos.	569	2,822,931	544,345	3,950,318	482,956	1,127,718	55,858	2,050,828	142,765	3,860,126	97.72	90,192	—51,835	—83,187	496,367
Norfolk & Western	April	2,220	5,238,016	752,888	6,281,943	936,349	1,569,601	69,617	2,547,330	174,327	5,313,082	84.58	968,861	577,464	711,989	355,151
	4 mos.	2,220	21,226,013	3,299,310	25,527,990	3,718,954	6,575,053	294,875	11,242,169	649,545	22,550,762	88.34	2,977,228	1,414,245	2,248,283	433,865
Norfolk Southern	April	942	543,563	120,473	707,793	114,288	107,087	17,822	330,950	32,239	602,703	85.15	105,090	92,411	42,577	76,294
	4 mos.	943	1,963,718	501,360	2,620,690	408,042	370,603	90,903	1,320,976	132,984	2,324,661	88.70	296,029	167,239	107,863	130,066
Northern Pacific	April	6,655	4,698,474	1,281,459	6,732,651	1,340,531	1,607,373	122,683	2,952,676	237,085	6,234,635	92.60	498,016	—167,968	43,565	—1,601,855
	4 mos.	6,655	17,867,644	5,389,419	25,981,458	3,955,722	6,659,171	471,308	12,324,576	1,045,113	24,760,129	95.30	1,221,329	—1,784,308	—818,316	—5,977,643
Northwestern Facific	April	534	299,502	209,471	588,866	108,862	73,353	9,284	258,303	20,016	472,019	80.16	116,847	86,207	81,089	42,721
	4 mos.	534	1,082,932	773,800	2,125,603	491,995	334,148	25,207	1,040,162	70,449	1,971,608	92.76	153,996	31,749	24,098	—46,401
Pennsylvania R. R.	April	7,358	26,039,165	10,798,260	39,948,392	4,813,549	9,462,603	432,947	16,944,503	1,175,472	33,548,159	83.98	6,400,233	4,671,346	3,774,469	12,841,299
	4 mos.	7,358	107,056,378	43,186,994	164,543,308	18,429,432	47,704,828	1,862,206	76,708,184	4,598,066	152,223,272	92.51	12,320,036	5,372,778	2,522,237	27,739,015
Baltimore, Chesapeake & Atlantic	April	87	83,719	28,421	114,894	15,713	32,860	2,048	72,624	3,619	126,865	110.42	—11,971	—15,771	—17,078	83
	4 mos.	87	313,085	111,932	435,248	54,967	146,618	6,184	286,413	15,817	509,999	117.17	—74,751	—89,959	—93,870	—17,811
Cincinnati, Lebanon & Northern	April	76	60,100	7,369	72,507	15,216	47,718	1,667	59,005	2,848	126,453	174.40	—53,946	—62,609	—65,703	15,422
	4 mos.	76	295,300	34,121	345,171	64,904	95,136	6,673	235,489	12,953	415,130	120.27	—69,959	—104,605	—110,894	—25,056
Grand Rapids & Indiana	April	569	540,690	158,922	754,489	59,920	151,740	18,647	365,508	25,726	621,858	82.42	132,631	96,828	74,460	92,957
	4 mos.	569	1,869,890	695,477	2,786,148	254,635	698,605	56,569	1,583,988	109,891	2,706,297	97.13	79,851	—63,369	—143,997	76,603
Long Island	April	398	615,155	1,201,696	2,010,359	255,754	469,452	21,554	1,155,638	63,418	1,985,628	98.77	24,730	—98,778	—129,177	314,630
	4 mos.	398	2,361,013	4,441,808	7,502,010	1,019,297	1,763,984	67,500	4,666,900	263,520	7,857,412	104.74	—355,402	—849,519	—969,349	831,957
Maryland, Delaware & Virginia	April	83	66,228	20,020	89,446	13,129	15,239	1,310	63,286	2,203	95,167	106.40	—5,722	—7,822	—7,691	—15,588
	4 mos.	83	232,684	79,149	323,602	44,962	60,146	3,868	244,858	10,336	364,171	112.54	—40,569	—48,972	—50,367	—102,184
New York, Phila. & Norfolk	April	122	301,000	76,975	393,565	52,665	145,912	8,276	324,959	14,681	560,570	142.43	—167,005	—190,867	—207,539	59,562
	4 mos.	122	1,469,000	389,427	1,990,205	208,972	549,458	34,961	1,293,779	56,750	2,194,171	110.25	—203,966	—299,311	—346,823	57,557
Pitts., Cinn., Chic. & St. Louis	April	2,383	4,722,500	1,758,520	7,418,530	1,104,160	2,250,003	123,029	3,458,748	231,194	7,242,748	97.63	175,782	—233,402	—613,653	—835,302
	4 mos.	2,383	21,492,300	7,740,149	32,636,203	3,797,998	10,436,144	489,671	15,961,744	1,000,591	31,953,060	97.91	683,143	—951,740	—2,300,355	76,864

*Corrected report.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Maintenance of: Way and structure.	Equipment.	Operating expenses: Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operations.	Operating income (or loss).	Net after rentals.	Increase (or decr.) comp. with last year.
West Jersey & Seashore	April	359	$245,000	$578,118	$873,627	$170,517	$191,016	$12,271	$538,334	$28,198	$949,976	108.74	—$76,350	—$134,625	—$152,172	—$80,907
	4 mos.	359	1,027,538	2,077,460	3,366,949	672,226	769,830	50,545	2,183,970	98,404	3,811,084	113.19	—444,136	—667,965	—725,145	—453,447
Peoria & Pekin Union	April	19	13,398	2,545	112,381	21,327	27,216	102	77,254	5,271	131,170	116.72	—18,789	—34,064	—21,749	19,046
	4 mos.	19	58,066	10,658	584,249	84,217	135,791	275	373,001	23,858	617,142	105.63	—33,130	—87,405	—7,591	3,788
Pere Marquette	April	2,238	2,425,586	448,006	3,097,631	369,639	647,581	48,344	1,284,478	111,941	2,469,065	79.71	628,566	424,867	309,164	1,110,992
	4 mos.	2,238	8,108,826	1,804,142	10,724,051	1,221,309	2,246,536	199,715	5,386,607	445,738	9,531,156	88.88	1,192,895	696,789	567,542	1,862,124
Philadelphia & Reading	April	1,126	5,827,756	871,852	6,974,219	826,370	1,803,152	47,275	2,788,608	177,323	5,664,869	81.23	1,309,350	1,067,484	847,133	1,004,565
	4 mos.	1,126	23,216,367	3,693,235	28,097,219	2,995,185	8,355,731	222,207	12,793,130	710,378	25,174,769	89.60	2,922,450	1,956,611	1,082,769	1,726,043
Atlantic City	April	177	117,151	171,126	296,321	50,485	48,741	2,537	191,391	1,757	295,014	99.56	1,307	—16,583	—42,116	30,274
	4 mos.	177	373,847	598,389	1,001,524	252,174	193,294	10,829	787,457	6,030	1,250,197	124.83	—248,674	—320,308	—415,703	—245,681
Perkiomen	April	41	80,105	8,368	93,652	6,942	3,742	13	37,555	693	48,945	52.26	44,707	41,563	36,104	6,864
	4 mos.	41	393,225	33,894	444,841	24,906	15,928	58	150,995	1,929	193,885	43.59	250,956	238,380	218,736	78,831
Port Reading	April	21	133,552	.....	193,079	19,523	10,356	18	67,361	3,846	101,105	52.37	91,974	78,811	16,049	147,766
	4 mos.	21	618,711	.....	848,593	65,019	29,757	72	328,976	4,736	428,560	50.50	420,033	367,381	112,558	288,644
Pittsburgh & Shawmut	April	103	39,804	6,399	47,695	21,122	50,412	2,480	26,831	7,165	108,009	226.46	—60,314	—60,480	—36,584	—82,530
	4 mos.	103	417,637	29,639	453,807	98,002	186,404	9,906	180,411	29,775	504,498	111.17	—50,691	—51,355	85,735	—113,093
Pittsburgh & West Virginia	April	63	55,608	11,848	98,116	34,048	44,978	2,043	55,159	10,852	158,625	161.67	—60,509	—80,651	—76,511	—16,618
	4 mos.	63	417,834	48,989	593,734	134,117	212,903	8,206	265,208	38,268	706,437	118.98	—112,703	—191,444	—169,667	20,033
Fittsburgh, Shawmut & Northern	April	210	91,171	7,494	100,556	28,397	48,390	1,839	45,113	5,714	129,459	128.74	—28,903	—31,155	—10,811	14,252
	4 mos.	210	359,767	33,578	399,464	104,229	221,321	6,203	206,695	24,173	562,641	140.85	—163,177	—172,138	—64,116	—55,773
Quincy, Omaha & Kansas City	April	253	50,907	25,542	83,226	31,340	15,233	1,125	76,518	2,275	126,390	151.86	—43,163	—47,313	—50,589	—12,874
	4 mos.	253	279,392	108,575	415,224	100,102	67,486	3,831	266,592	9,808	446,522	107.54	—31,298	—47,924	—63,120	22,591
Richmond, Fredericks. & Potomac	April	117	525,879	401,255	1,044,271	188,338	165,162	9,443	395,118	31,145	833,146	79.78	211,125	184,822	131,927	—24,646
	4 mos.	117	1,882,249	1,471,190	3,745,137	636,711	619,483	32,098	1,585,288	119,894	3,071,702	82.02	673,434	539,654	348,866	—609,690
Rutland R. R.	April	415	253,865	114,895	448,073	102,196	121,436	7,415	217,858	16,271	466,943	104.21	—18,797	—42,471	—31,689	—91,825
	4 mos.	415	1,084,345	479,523	1,848,503	373,509	467,314	33,738	957,440	60,220	1,899,372	102.75	—50,797	—146,113	—80,958	—19,348
St. Louis-San Francisco	April	4,760	4,558,726	1,592,786	6,505,065	735,089	1,378,325	80,177	2,656,004	219,111	5,025,232	77.25	1,479,834	1,225,337	1,279,479	693,883
	4 mos.	4,760	18,575,953	6,871,626	27,201,231	3,032,969	5,364,260	353,625	11,392,458	912,056	20,894,943	76.82	6,306,289	5,238,343	5,255,624	1,731,579
Fort Worth & Rio Grande	April	235	90,480	34,337	139,428	39,092	30,135	3,741	74,008	7,855	154,403	110.74	—14,976	—18,665	—29,659	—15,473
	4 mos.	235	322,608	175,288	541,540	156,488	105,167	14,092	334,120	29,810	638,676	117.94	—97,137	—111,948	—167,951	—54,827
St. Louis, San Fran. & Texas	April	134	107,357	17,906	132,336	34,948	32,535	3,609	81,101	7,102	159,241	120.33	—26,905	—29,241	—60,855	—2,113
	4 mos.	134	461,058	79,359	570,524	175,898	142,292	13,986	372,312	26,988	731,285	128.18	—160,761	—169,192	—313,765	—119,915
St. Louis Southwestern	April	968	1,121,471	143,750	1,323,771	131,923	234,891	44,251	380,046	57,172	855,086	64.59	468,686	412,314	377,319	—56,913
	4 mos.	968	4,674,766	632,347	5,537,841	655,476	1,014,531	195,287	1,710,973	226,913	3,832,050	69.20	1,705,791	1,511,643	1,397,961	—750,093
St. Louis Southwestern of Texas	April	807	421,237	95,250	565,291	137,994	162,261	21,892	322,298	37,829	682,158	120.67	—116,867	—141,105	—128,198	4,192
	4 mos.	807	1,856,508	401,329	2,449,594	583,316	757,510	86,818	1,373,656	146,006	2,951,444	120.49	—501,850	—598,232	—534,097	249,756
San Antonio & Aransas Pass	April	738	336,815	76,867	443,722	100,776	113,268	9,853	244,144	26,900	494,849	111.52	—51,127	—64,396	—68,721	—74,988
	4 mos.	738	1,358,082	324,448	1,798,299	467,400	422,106	42,557	1,078,571	101,404	2,110,195	117.34	—311,895	—364,982	—339,842	81,745
San Antonio, Uvalde & Gulf	April	317	97,453	24,641	134,649	16,837	17,464	2,937	46,400	6,560	90,199	66.99	44,451	41,355	27,421	71,172
	4 mos.	317	240,566	103,037	391,085	56,513	59,804	10,870	173,681	26,826	327,695	83.79	63,390	51,872	7,951	197,603
Seaboard Air Line	April	3,563	2,537,089	722,646	3,551,336	393,053	623,861	126,798	1,834,633	157,166	3,172,628	89.34	378,708	226,425	54,508	997,710
	4 mos.	3,563	10,748,652	3,733,761	15,752,133	1,795,978	2,596,759	509,928	7,844,933	613,509	13,544,595	85.99	2,207,538	1,601,375	919,384	1,114,758
Southern Ry	April	6,971	7,114,768	2,407,209	10,441,757	1,641,914	1,812,409	211,165	4,590,448	344,233	8,682,500	83.15	1,759,257	1,420,049	998,461	—502,645
	4 mos.	6,971	27,773,695	10,415,233	42,086,023	7,323,168	8,762,917	861,463	20,225,782	1,396,772	38,946,849	92.54	3,139,174	1,802,222	31,926	—6,169,898
Alabama Great Southern	April	313	573,123	150,321	771,367	109,463	158,330	27,525	361,696	25,596	687,928	89.18	83,439	59,082	61,314	—132,761
	4 mos.	313	2,379,796	662,378	3,246,156	504,408	731,246	90,995	1,594,456	94,176	3,042,084	93.71	204,072	104,267	112,323	—475,227
Cincinnati, N. O. & Tex. Pac	April	338	1,111,295	257,906	1,466,514	210,675	319,925	36,714	578,747	41,396	1,198,048	81.69	268,466	214,940	235,508	—69,361
	4 mos.	338	4,290,502	1,251,237	5,920,428	840,924	1,616,911	121,388	2,687,784	168,346	5,488,134	92.70	432,294	239,002	232,754	—942,871
Georgia Southern & Florida	April	402	247,667	90,569	371,196	79,700	84,963	9,039	204,624	12,694	394,116	106.17	—22,920	—40,433	—65,149	—114,108
	4 mos.	402	1,022,517	386,522	1,545,584	357,694	369,832	35,698	907,816	52,245	1,737,847	112.44	—192,263	—261,032	—350,314	—546,287
New Orleans & Northeastern	April	207	407,597	90,594	537,770	98,223	84,940	15,492	252,532	18,121	473,262	88.00	64,508	23,105	18,000	—30,139
	4 mos.	207	1,724,353	369,043	2,280,626	396,905	441,966	51,474	1,136,915	66,019	2,112,479	92.63	168,147	10,930	—131,159	—393,717
Northern Alabama	April	110	46,572	11,903	61,404	4,695	5,031	1,940	29,452	3,416	44,533	72.52	16,871	13,012	484	4,804
	4 mos.	110	247,527	57,626	316,594	65,192	22,095	7,765	174,880	13,868	283,801	89.64	32,794	16,102	—40,028	—68,912
Columbus & Greenville	April	278	68,564	23,821	98,571	41,525	17,455	3,668	73,128	6,900	142,677	144.75	—44,106	—57,519	—77,371	—10,877
	4 mos.	278	403,891	122,802	560,837	169,703	92,768	14,621	332,740	26,342	636,173	113.43	—75,337	—128,500	—226,809	—100,042
Southern Pacific	April	7,110	9,049,562	4,103,175	14,982,622	2,278,091	2,785,295	206,025	5,868,758	489,248	11,913,941	79.52	3,068,680	2,155,453	2,072,947	2,705,434
	4 mos.	7,110	35,829,280	17,138,584	59,241,676	8,271,958	10,566,536	868,641	24,215,683	1,860,461	46,962,518	79.27	12,279,158	8,617,474	8,145,761	2,312,407
Arizona Eastern	April	382	193,385	43,201	256,430	42,806	49,957	2,932	95,580	23,564	218,846	85.34	37,584	10,836	16	38,652
	4 mos.	382	933,617	189,418	1,209,279	207,719	190,061	14,721	440,230	90,580	964,652	79.77	244,625	137,568	89,794	—72,273
Atlantic Steamship Lines	April	...	848,667	73,284	964,781	18,713	232,776	20,854	551,193	33,834	837,370	88.87	107,411	95,888	99,173	474,986
	4 mos.	...	3,205,130	275,794	3,680,314	59,281	739,021	69,744	2,441,621	113,288	3,422,954	93.01	257,360	211,263	216,463	2,087,991

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operations.	Operating income (or loss).	Net after rentals.	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structure.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.					
Galveston, Harris & S. Antonio	April 1,380	$1,375,222	$445,849	$1,992,147	$409,375	$453,439	$54,640	$874,474	$83,642	$1,890,694	94.91	$101,453	$58,174	—$55,947	$350,181
	4 mos. 1,380	6,524,687	1,867,393	9,036,367	1,463,408	1,950,221	203,526	3,646,938	329,337	7,656,231	84.73	1,380,136	1,206,612	668,119	1,143,807
Houston & Texas Central	April 932	677,941	213,896	934,348	301,131	172,167	21,692	379,659	33,967	906,666	97.04	27,682	—16,430	—80,488	109,070
	4 mos. 932	2,957,363	863,448	4,041,190	1,059,385	733,152	83,178	1,731,909	132,296	3,737,294	92.48	303,896	127,806	—54,554	—18,305
Houston, East & West Texas	April 191	167,616	44,225	222,326	63,214	31,567	3,516	93,112	7,053	198,472	89.27	23,854	15,870	3,088	100,803
	4 mos. 191	669,209	186,137	901,021	229,682	141,837	14,514	451,027	30,161	867,193	96.25	33,828	1,723	—64,462	91,182
Louisiana Western	April 207	198,501	88,363	310,987	56,325	68,594	10,580	116,651	17,040	273,702	88.01	37,285	9,890	—182	—38,864
	4 mos. 207	946,938	396,137	1,433,647	219,864	333,019	45,604	485,380	66.678	1,167,970	81.47	265,677	152,366	132,468	—230,270
Morgan's L. & T. R. R. & S. S. Co.	April 400	483,358	155,417	682,080	161,493	162,677	16,356	327,395	32,170	705,535	103.44	—23,455	—72,794	—109,879	—83,563
	4 mos. 400	2,132,634	667,778	2,985,183	672,189	673,972	71,502	1,377,198	124,472	2,940,357	98.50	44,826	—152,208	—303,148	—832,506
Texas & New Orleans	April 475	459,987	146,399	651,905	152,985	213,090	12,113	301,670	24,005	710,384	108.97	—58,479	—78,662	—108,893	—69,528
	4 mos. 475	2,120,181	621,473	2,890,501	620,056	859,278	49,994	1,330,977	100,876	2,987,643	103.36	—97,142	—178,477	—333,550	—268,086
Spokane International	April 165	100,138	16,092	120,052	22,910	8,980	3,581	38,129	6,335	80,754	67.27	39,298	31,672	26,583	—9,392
	4 mos. 156	341,461	67,631	424,904	72,988	33,443	13,472	154,258	25,253	301,838	71.04	123,066	94,941	72,605	—80,114
Spokane, Portland & Seattle	April 549	385,797	142,879	581,232	51,127	93,215	8,801	216,067	23,243	398,686	68.59	182,546	101,594	100,675	—23,386
	4 mos. 549	1,478,588	568,360	2,242,425	280,370	387,880	35,039	904,039	94,204	1,732,828	77.27	509,597	178,365	171,419	—287,042
Terminal Railroad Assoc. of St. L.	April 36	.....	.....	345,025	89,549	32,789	980	129,197	9,330	264,394	76.92	79,632	27,026	135,016	99,229
	4 mos. 36	.....	.....	1,469,395	347,739	147,810	3,845	583,557	35,727	1,133,265	77.12	336,130	154,673	603,865	111,485
East St. Louis Connecting	April 3	.....	.....	116,652	18,626	2,290	346	58,921	3,486	83,669	71.73	32,984	28,608	18,250	89,433
	4 mos. 3	.....	.....	551,889	84,430	24,905	1,354	286,161	14,952	411,802	74.62	140,087	127,714	81,379	281,257
St. L. Merchants Bridge & Term.	April 9	.....	.....	288,625	39,077	11,336	3,775	157,872	6,839	193,428	67.02	95,197	78,579	95,199	187,426
	4 mos. 9	.....	.....	1,173,022	205,456	102,031	206	722,584	28,515	1,062,360	90.57	110,662	55,403	109,335	351,613
St. Louis Transfer Ry.	April 6	.....	.....	84,875	10,506	2,361	793	35,491	2,004	50,568	59.58	34.208	33,945	29,160	39,742
	4 mos. 6	.....	.....	387,907	40,538	15,049		164,000	8,233	228,612	58.93	159,295	157,683	139,058	79,674
Tennessee Central	April 292	151,147	49,056	211,149	46,941	46,116	5,237	106,229	12,271	216,793	102.67	—5,644	—10,243	—31,019	—28,154
	4 mos 292	565,259	194,220	808,230	169,600	182,775	19,134	452,742	45,962	870,166	107.66	—61,936	—81,574	—166,766	—91,990
Texas & Pacific	April 1,952	1,915,567	731,907	2,813,472	597,193	626,361	48,433	1,199,444	108,702	2,611,196	92.81	202,276	74.283	12,244	64,591
	4 mos. 1,947	8,486,448	3,089,710	12,421,722	2,163,489	2,822,411	221,416	5,353,319	412,434	11,097,440	89.34	1,324,283	812,369	315,193	440,991
Toledo, Peoria & Western	April 247	71,495	45,241	126,357	27,170	43,103	2,748	94,785	8,799	195,009	83.37	38,907	32,067	7,444	87,153
	4 mos. 247	315,354	210,404	568,872	134,439	202,020	12,432	399,626	41,341	976,417	103.06	—26,032	—53,473	—119,725	187,382
Toledo, St. Louis & Western	April 454	636,565	26,951	639,300	135,088	15,774	2,200	72,134	8,173	122,701	88.30	16,262	7,295	1,296	25,144
	4 mos. 454	2,627,880	117,539	2,870,768	463,014	62,088	8,266	260,306	34,010	453,665	111.33	—46,179	—74,079	—85,158	26,689
Trinity & Brazos Valley	April 368	210,277	15,949	233,916	43,103	45,573	272	359,186	7,908	668,474	103.39	—21,941	—34,362	20,196	35,917
	4 mos. 368	748,156	71,204	850,385	202,020	221,470	1,146	1,897,927	33,016	3,095,704	92.74	242.371	197,952	376,729	472.987
Ulster & Delaware	April 128	91,442	19,946	138,963	15,774	23,752	149,454	2,449,288	352,124	5.461,891	68.53	2,508,345	2,119,275	2,024,651	1,374.938
	4 mos. 128	237,388	74,088	407,485	62,088	86,119	548,002	10,761,388	1,365,020	23,737,220	74.29	8,215,059	6,162,931	5,656,493	—4,404,025
Union Railroad of Pennsylvania	April 45	.....	.....	646,533	51,147	249,961	38,157	888,062	137.314	2,028.601	78.67	549,970	317,787	284,177	—25.814
	4 mos. 45	.....	.....	3,339,075	232,464	932,151	179,348	3,850,063	536,342	8,758,141	83.20	1,768,429	693,758	577,263	—3,343,300
Union Pacific	April 3,614	5,732,093	1,488,193	7,970,235	743,274	1,611,989	60,606	960,520	137,731	2,006,570	86.04	325,698	144,185	65,470	—77,933
	4 mos. 3,614	22,927,054	6,070,903	31,952,279	2,954,237	7,409,094	240,582	4,062,952	565,023	8,592,597	98.07	168,755	—556,674	—880,293	—2,338,035
Oregon Short Line	April 2,359	1,897,881	461,718	2,578,571	396,708	518,111	3,079	112,301	14,996	209,591	82.65	43,997	32,085	16,098	82.101
	4 mos. 2,359	7,649,411	1,979,792	10,526,569	1,666,521	2,306,694	10,647	510,166	62,920	916,713	90.44	96,852	—9,555	—6,351	56.827
Oregon Wash. R. R. & Nav. Co.	April 2,223	1,654,804	473,459	2,332,269	414,518	379,128	357	26,459	3,770	97,368	101.52	—1,456	45,302	—24,937	—51.673
	4 mos. 2,223	6,011,910	2,001,824	8,761,352	1,863,826	1,715,058	1,549	110,605	15,395	335,554	80.10	83,383	49,994	28,649	—197,800
St. Joseph & Grand Island	April 258	207,030	27,389	253,588	33,777	45,438	32,328	426,049	58.38	635,004	43,997	539,612	557.290	235.061	
	4 mos. 258	831,058	124,453	1,013,565	129,539	202,342	127,256	1,811,959	72.30	1,530,764	96,852	1,151,431	1,288,717	268.691	
Utah R. R.	April 98	95,125	445	95,914	28,317	40,071	178,009	2,078,032	86.46	663,442	—1,456	512,583	263,666	1,943,979	
	4 mos. 98	414.096	1,915	418,937	68,749	140,861	738,636	8,926,283	89.44	2,031,828	83,383	1,457,966	611,953	3,249,566	
Virginian Ry.	April 526	1,333,893	69,761	1,525,897	164.523	261.402	9,375	426,049	58.38	635,004	43,997	539,612	557.290	235.061	
	4 mos. 526	4,838.715	298,459	5,527,035	733,706	1,277,244	40.612	1,811,959	72.30	1,530,764	96,852	1,151,431	1,288,717	268.691	
Wabash Ry.	April 2,472	3,902,844	744,865	4,901,461	876,766	954,160	119,362	2,078,032	86.46	663,442	—1,456	512,583	263,666	1,943,979	
	4 mos. 2,472	14,910,827	3,206,786	19,239,034	2,905,056	4,059,115	455,448	8,926,283	89.44	2,031,828	83,383	1,457,966	611,953	3,249,566	
Western Maryland	April 797	1,338,945	82,650	1,485,701	183,807	328,099	27,925	573,862	53,956	1,189,585	80.07	296,116	246,116	252,735	301,629
	4 mos. 797	5,475.586	367,875	6,182,909	752.772	1,588,830	108,217	2,502.730	214,437	5,260.430	85.08	922,479	692,479	972,576	852,315
Western Pacific	April 1,011	645,935	214,208	920,464	154,929	194,200	35,646	385,824	54,078	846,543	91.97	73.921	—5,578	40,985	—3,221
	4 mos. 1,011	2,657,930	750,936	3,626,658	554.104	779,228	127,297	1,559,545	185,835	3,281,936	90.49	344,721	59,087	310,357	—359,989
Wheeling & Lake Erie	April 511	882,899	78,857	1,032,369	141,513	247,521	12,849	435,403	44,839	886,174	85.84	146,194	70,731	70,246	130,229
	4 mos. 511	3,286,116	328,320	3,896,607	579,415	1,020,971	55,960	1,878,316	170,211	3,721,959	95.52	174,648	—128,104	—191,594	50,801

Freight Rate Proposals in Congress

Representative Sweet of Iowa has introduced in the House of Representatives a bill to amend the transportation act so that it will not authorize interference with the regulation of intrastate commerce by the several states; to repeal Section 15a of the act, which contains the 5½ to 6 per cent rule of rate-making, and to limit the effect of orders of the Interstate Commerce Commission to prevent their application to intrastate traffic.

A resolution adopted by the California legislature objecting to the rate-making provision of the transportation act of 1920 has been presented to the United States Senate in which Congress is asked to eliminate the objectionable features pointed out and to "grant a rate structure that will not place the false earning power on a large fictitious railroad capital, the payment of which is stifling to industries of the Pacific Coast."

Senator Kellogg of Minnesota has presented in the Senate a resolution adopted by the Minnesota legislature petitioning Congress to take such action as will nullify the orders of the Interstate Commerce Commission as to intrastate rates and to so amend the act to regulate commerce as to forbid such orders in the future.

Government Attitude as to Automatic Train Stops

Commissioner C. C. McChord, speaking for Division I of the Interstate Commerce Commission—Messrs. McChord, B. H. Meyer and C. B. Aitchison—has written to the American Railway Association concerning the automatic train control situation, and the substance of the letter has been issued by Secretary J. E. Fairbanks, in circular No. 2,163, for the information of the members of the association.

The members of Division 1 are agreed that no unnecessary delay or obstruction should be indulged. The letter, with this introduction, goes on to recount briefly the history of what has been done by the government, since 1906, when Congress first called for an investigation of the subject; and now "it is apparent that Congress expects definite and prompt action on our part." Mr. McChord thinks that as the automatic stops now in operation on the Chicago & Eastern Illinois and other roads have been functioning for some time, the report of the government inspectors concerning them ought soon to be available. Continuing, the letter says: "It is the Commission's desire not to be forced to issue specific orders to the various carriers, nor to discourage initiative in the matter of the installation of these devices on the part of the carriers. We suggest that you [the A. R. A.] indicate to the various executives that it is the Commission's desire to effectuate the purposes of Section 26 within the two-year period mentioned therein and that proper steps to that end be taken. We are pleased to note the interest being taken in the matter by the Joint Committee."

Railway Returns for April

The net operating income in April of the railroads of the United States totaled $29,201,000, or $1,494,000 less than it was in March. On the basis of the tentative valuation fixed for rate-making purposes by the commission, this would be at the annual rate of return of 2.18 per cent, as compared with 2.30 per cent in March. The carriers in April fell short $51,286,000, or approximately 64 per cent of earning the amount contemplated by the law.

The ratio of operating expenses to revenues in April was 86.74 per cent, compared with 87.19 per cent in March. Reductions, compared with April, 1920, in operating expenses were reported in all districts. The total operating revenues of the railroads in April were $433,181,000, or an increase of 7.7 per cent over those for the same month last year, while operating expenses were $375,752,000, or a decrease of 6.2 per cent under April, 1920. The net operating income was $29,201,000, compared with an operating deficit of $23,767,000 in April, 1920. In considering comparisons with April last year, however, consideration must be given to the fact that railroad operations were affected that month by the switchmen's outlaw strike.

During the eight months since September 1, 1920, when the guaranty period expired, the net operating income of the carriers has totaled $279,008,000, which would be at the annual rate of return of 2.41 per cent on the tentative valuation of the railroads. This sum, however, is $414,253,000 under the amount contemplated to be earned from the rates established by the commission.

Report on Collision at Welch, West Virginia

The Interstate Commerce Commission has issued a report on the collision which occurred on the Norfolk & Western near Welch, W. Va., on May 3, last, when six passengers were killed and 41 passengers and one employee were injured. This accident occurred on the Tug Fork branch, and the train, passenger No. 160, consisting of a locomotive and five cars, was moving backwards at about 15 to 18 miles an hour. It ran over a misplaced switch and collided with some loaded coal cars, wrecking two passenger coaches. The switch had been left misplaced by trackmen, working near it, and Foreman Fine is held responsible; and Brakeman Powell, at the rear of the train—that is, on the leading car—is held blameworthy for not keeping a good lookout. The inspectors believe that he should have discovered the open switch in time to make an emergency application of the air brakes. The inspectors cannot decide whether Foreman Fine left the switch open, and forgot it, or closed the switch and later instructed Sectionman Hale to throw it, on the assumption that it was still set for the side track. The sectionman may have thrown it, on instruction, without observing its position.

Valuation Bill Hearing

The Senate committee on interstate commerce held a brief hearing on June 10 and 11 on the bill to amend the valuation act by striking out the provision requiring the Interstate Commerce Commission to report separately the cost of acquisition of land. The bill was opposed by S. W. Moore, counsel for the Kansas City Southern, and W. G. Brantley, representing the President's Conference Committee on Valuation, who asked that the provision be left in the law and that the question of the weight to be allowed to this part of the evidence of value be left to the courts. Otherwise, they said, if the courts should decide that this evidence had been improperly excluded it might require considerable delay. The bill was advocated by P. F. Farrell, chief counsel of the Interstate Commerce Commission, and J. E. Benton, solicitor for the National Association of Railway and Utilities Commissioners. Mr. Farrell contended that the provision now requires the commission to spend a large amount of time and money to get an estimate, which he called a mere guess, of no use to anyone. He said the commission has all the information necessary to the determination of the real value of railroad lands when it finds the original cost and the present value, and its finding as to a present value based on the value of adjacent lands does not mean that that exact amount is to be allowed in making a final valuation.

Compliments of the Santa Fe to the Great Western

Isaiah Hale, safety superintendent of the Atchison, Topeka & Santa Fe, believes that good records made by other railways may be effectively used to stimulate officers and employees of the Santa Fe to increase exertion, and under date of May 17, 1921, he issued and posted a bulletin on his railway which refers as follows to the safety drive on the Chicago Great Western:

The Chicago Great Western Railroad inaugurated a Safety Drive January 1, to continue during the calendar year. Their record of injuries to employees during March this year shows a reduction of 65 per cent, as compared to same month last year; in the first three months they show a reduction of 64 per cent. Their Western Division of 377 miles has not had a reportable injury (that is, one resulting in loss of more than three days' time) since January 1, a stretch of 128 days, and to prove this in itself is not an accident, let it be known that their Northern Division has not had such an injury in 74 days.

American railroad history records no other similar performance which is a solar plexus blow to the argument that "you can't stop accidents," "they are bound to occur," etc. We cannot decrease their number if we constantly keep telling ourselves we can't; nor can we do anything else, in striving for which we admit we are whipped before the start.

We are not speaking disparagingly of the Chicago Great Western when we say the physical condition of their property is no better than ours; the thing then that makes this record possible is the employee—individually and collectively—and we must swallow the distinctly bitter pill of having to admit that our organization suffers by comparison with theirs.

Do you know of any good reason why we should be content to mark time while Chicago Great Western men are making such wonderful progress and attracting the attention and admiration of the entire railroad world?

Shriners' Convention Creates Heavy Passenger Movement

The Imperial Council Session of the Mystic Shrine at Des Moines, Iowa, on June 14, 15 and 16, provided the railroads with the largest passenger movement to any convention of the year and the roads entering that city made elaborate preparations to handle the Shriners going to the session from all points in the country.

It is estimated that the Chicago, Milwaukee & St. Paul and the Chicago, Rock Island & Pacific handled about 25,000 passengers, with equal participation. Next in rank came the Chicago & North Western, while large local movements were also handled by the Chicago, Burlington & Quincy and the Great Western. The movement on the St. Paul comprised organized parties from 20 different points over the country, the largest being a 13-car special train from Tacoma, Wash., carrying the Imperial Potentate of the Order, Lewis Garretson, and Shriners from Everett and Spokane, Wash., Butte, Mont., and other points along the route. It is interesting to note that the Denver, Colo., special was cancelled when the Shriners from that territory turned over their services and money to the flood refugees. The Rock Island lines handled 32 special trains with a total of over 10,000 passengers, the largest special train coming from Brooklyn, N. Y. Another train handled by this road came from California and a third from Newark, N. J. The North Western carried organized movements of passengers from Columbus, Ohio, Indianapolis, Ind., and Atlanta, Ga. One of the trains operated over the Great Western was made up at Washington, D. C.

Illinois Central Begins Program of Improvements

C. H. Markham, president of the Illinois Central, on June 10, sent the following circular letter to officers and employees of that system:

"I have been endeavoring to keep you advised in regard to important developments affecting the Illinois Central System. In a communication addressed to you March 1, 1921, I said that it was necessary to put our affairs in such shape that we would be enabled to grasp the first signs of business revival to start upon that program of expansion and development necessary to the well-being of the business interests dependent upon the Illinois Central System for transportation service.

"The decision of the Labor Board in regard to the reduction of wages, when it becomes effective will result in a substantial decrease of the operating expenses of the Illinois Central System. You will be interested in learning that we intend to invest that money in maintenance which has been deferred—in the employment of additional men and in the purchase of materials and supplies. We have not waited for the money to come in, but we have already entered upon our program, and we believe that other railways will do likewise.

"The action of the Labor Board, therefore, operates as the first signal for the opening up of business which will redound to the benefit of the public at large. The crop prospects are favorable. This railway recognizes its pressing duty to patrons to place its roadway and equipment in condition to serve them this fall. The Labor Board decision will help to enable it to meet that duty.

"You are aware of the agitation for a reduction of freight and passenger rates. The Interstate Commerce Commission is watching that question closely. Already many of the freight rates have been adjusted, and other adjustments are under consideration at the present time. However, on account of the physical condition of the railways and the great necessity of spending large sums to bring them back to their former state of efficiency, it is not believed that rates can be reduced generally at any time within present vision. The railways must first be restored, and that will absorb all the money in sight for some time to come, and much more if it were available.

"I feel that, while you will naturally regret to give up any portion of the increase in wages that was granted to meet living costs when they were at their peak (and I regret that it is necessary that you should do so), you will recognize that the reduction was inevitable, since the costs of living have been reduced. I am confident that you will meet this situation in that same wholesome spirit with which you met each trying situation that confronted you during the last few years."

Traffic News

A bill to amend the Interstate Commerce Act to provide for seasonal rates on coal has been introduced in the House of Representatives by Mr. Linthicum.

The Senate committee on oceanic canals on June 13 ordered a favorable report on the bill introduced by Senator Borah, providing that no tolls shall be levied upon vessels passing through the Panama Canal engaged in the coastwise trade of the United States.

The Southern Pacific will put into effect on July 15, a rate of $16.50 per ton on copper bullion, copper matte, blister copper, also lead bullion and speiss, in carloads, with a minimum weight of 60,000 lb., from points in Arizona and New Mexico to New York, and points taking New York rates, by rail, to Galveston, Tex., and thence by steamship. The reduction amounts to $20 a ton.

The Senate on June 10 passed with minor amendments the bill, S. 621, providing an additional extension of one year to shippers as to claims in respect of overcharges made during the period of federal control. The bill was recommended both by the Interstate Commerce Commission and the director general of railroads. It amends Subdivision C of Section 206 of the Transportation Act.

The Interstate Commerce Commission on June 10 issued a sixth section permission order authorizing the western transcontinental railroads, represented by R. H. Countiss as agent, to put into effect on one day's notice a rate of $1.75 per 100 lb. on vegetables, melons and cantaloupes from Pacific Coast terminals and intermediate points to eastern points in place of rates ranging from $1.83 to $2.08½.

The state commissions of Alabama and of Tennessee have issued orders requiring the American Railway Express Company to co-operate with the Southeastern Express Company in making through routes and rates substantially in accordance with the practice which prevailed before the establishment of the Southeastern Express Company and when the American operated over the lines of the Southern Railway Company.

Plans for the shipment of more than 10 per cent of the Pacific Coast fruits and vegetables to the eastern seaboard through the Panama Canal have been announced in a statement to the press by C. S. Whitcomb, president of the Pacific Producers' Association. Another statement announced that the western fruit shippers would not accept a reported proposal of the railroads that the rates on citrus fruits to the east be reduced 10 per cent on condition that the shipments be confined to the rail carriers. "The consumer fixes the price," said Mr. Whitcomb, "and our hope is to be able to come within that price." Answering criticisms, Mr. Whitcomb says that in hot spells it is impossible to keep the price of lemons normal.

Anthracite Shipments, May, 1921

The shipments of anthracite in May as reported to the Anthracite Bureau of Information, amounted to 5,793,895 tons, a decrease as compared with the preceding month of April, of 173,570 tons, and 361,983 tons less than tonnage shipped during May of last year, when 6,155,878 tons were shipped to market, and reflected the benefit of the termination of the switchmen's strike.

Shipments by originating carriers were:

	May, 1921	April, 1921
P. & R.	1,108,476	1,123,585
L. V.	1,027,688	1,102,965
C. R. R. of N. J.	544,716	537,822
D. L. & W.	915,191	929,271
D. & H.	753,039	812,967
Penna. R. R.	409,027	416,847
Erie R. R.	630,574	630,471
N. Y., O. & W.	153,809	128,684
L. & N. E.	251,375	284,853
Total	5,793,895	5,967,465

Commission and Court News

United States Supreme Court

Penalties Not Recoverable Against Director General

In a proceeding for a penalty for non-payment of wages of a railroad employee, wrongfully discharged, brought under an Arkansas statute, the railroad appealed from a judgment by default to the State Circuit Court and there moved to substitute the Director General of Railroads. This substitution the court refused to make, but joined the Director General as defendant and entered judgment against both him and the company for the debt and penalty. This judgment was affirmed by the State Supreme Court but it is now reversed by the United States Supreme Court for the following reason: "As the Federal Control Act did not impose any liability upon the companies on any cause of action arising out of the operation of their systems of transportation by the government, the provision in Order No. 50 authorizing the substitution of the Director General as defendant in suits then pending was within his power; the application of the Missouri Pacific that it be dismissed from this action should have been granted; and the judgment against it should, therefore, be reversed." The government did not, under section 10 of the Federal Control Act, undertake to punish itself for any departure from the existing laws by the imposition upon itself of fines and penalties or to permit any other sovereignty to punish it. The judgment against the Director General, so far as it provided for recovery of the penalty was therefore held erroneous. Judgment reversed. Missouri Pacific v. Ault. Decided June 1, 1921. Opinion by Mr. Justice Brandeis.

Supreme Court Sustains Railroad in Objection to Assessment for Highway Construction

In answer to a petition filed by the Kansas City Southern and the Arkansas & Ft. Smith against Road Improvement District No. 6, Little River County, Ark., opposing the levying of an assessment against the railways for the construction of permanent roads, the Supreme Court of the United States sustained the protest of the railways, declared the assessment excessive and expressed doubt regarding the railway receiving any benefit from such an improvement. This road district was created in accordance with an act of the Arkansas legislature to include approximately 25,000 acres and within them 9.7 miles of main track owned and operated by the Kansas City Southern and the Arkansas & Ft. Smith, together with the corresponding right-of-way covering 130 acres and requisite station buildings. Little River County is distinctly agricultural, has an area of 546 square miles, and 16,000 inhabitants. The improvement district was created for the purpose of constructing 11.2 miles of gravel road through taxation upon real property, defined by the statute as "land, improvements thereon, including railroads, railroad right-of-way and improvements thereon, such as public buildings, sidetracks, etc., and tramroads."

A duly appointed board assessed the benefits to the roads on account of the proposed road at $7,000 per mile of main track—$67,900. They divided the farming lands into five zones, determined by distance from the highway, and assessed uniform benefits upon all within the same zone without regard to improvements or market value—in the first $12 per acre, second $10, third $8, fourth $6 and fifth $4. Town lots were likewise assessed without reference to value or improvements at $10, $15, $20, and $25 each, according to location. A pipe line, telephone line, and telegraph line were severally assessed at $2,500, $300 and $300 per mile, without any designated basis.

The railways maintained that the assessment upon their property was unequal, arbitrary, unreasonable and in violation of the Fourteenth Amendment. The state courts held to the contrary.

In its decision the Supreme Court stated that the settled rule is that a state legislature "may create a taxing district to meet the expense of local improvements, and may fix the basis of taxation without encountering the Fourteenth Amendment unless its action is palpably arbitrary or a plain abuse." Ordinarily, the levy may be upon lands specially benefited according to value, position, area, or the front-foot rule.

The statute under consideration prescribes no definite standard for determining benefits from proposed improvements. The assessors made estimates as to farm lands and town lots according to area and position and wholly without regard to their value, improvements thereon, or their present or prospective use. On the other hand, disregarding both area and position, they undertook to estimate benefits to the property of plaintiffs in error without disclosing any basis therefor, but apparently according to some vague speculation as to present worth and possible future increased receipts from freight and passengers which would enhance its value, considered as a component part.

Obviously, the railroad companies have not been treated like individual owners, and we think the discrimination so palpable and arbitrary as to amount to a denial of the equal protection of the law. Benefits from local improvements must be estimated upon contiguous property according to some standard which will probably produce approximately correct general results. To say that 9.7 miles of railroad in a purely farming section, treated as an aliquot part of the whole system, will receive benefits amounting to $67,900 from the construction of 11.2 miles of gravel road seems wholly improbable, if not impossible. It is doubtful whether any very substantial appreciation in value of the railroad property within the district will result from the improvements; and very clearly it cannot be taxed upon some fanciful view of future earnings and distributed values, while all other property is assessed solely according to area and position. Railroad property may not be burdened for local improvements upon a basis so wholly different from that used for ascertaining the contribution demanded of individual owners as necessarily to produce manifest inequality. Equal protection of the law must be extended to all.

Risk on Team Track, First 48 Hours

Shipments of grapes were transported from different points of origin to Chicago, arriving on different days. On arrival each car was placed on a public delivery track and notice thereof given. The consignee accepted each car, breaking the seals. Loss occurred after acceptance and commencement of unloading. In an action for damages the question was whether the railroad was liable therefor, and in what capacity—whether as carrier or warehouseman, or at all. The bill of lading provided that "Property not removed within 48 hours after notice of arrival, may be kept by the carrier as warehouseman only, . . . Controversies have arisen as to this provision, the decisions differing. Consignee contends that the railroad during the 48 hours is responsible as a carrier, this relation not terminating until the expiration of that time. The contention of the railroad company is *contra,* that it, the company, is neither liable as a carrier nor as warehouseman; not as carrier because the shipment had been delivered and accepted, and not as warehouseman because no negligence has been proved against it. Affirming a judgment of the state court for the consignee the United States Supreme Court says: "The property here was not delivered; access was only given to it that it might be removed, and a period of 48 hours was given for the purpose. Pending that time it was within the custody of the railroad company, which had the same relation to it as during transportation. The bill of lading is definite as to the time at which responsibility of the company shall be that of warehouseman, and by necessary implication until that responsibility attaches, that of carrier exists."—Michigan Central v. Owen & Co. Decided June 1, 1921. Opinion by Mr. Justice McKenna.

Mr. Justice McReynolds dissented in an opinion in which he says that section 5 of the Uniform Bill "does not purport to establish any rule of liability during the 48 hours, but leaves that to be determined by application of the common law to the circumstances. To say that a carrier insures for 48 hours although the consignee has taken actual custody of the goods would seem an absurd conclusion. And the practical impossibility of stationing an agent at every car within a great terminal while freight is being removed by thousands of consignees and their agents—a necessary precaution if thefts or mistakes by any of them must be prevented—makes it manifest that the Interstate Commerce Commission would not have sanctioned the responsibility now claimed and that the carriers would not have acquiesced."

Foreign Railway News

Wage Reductions in Belgium

Reductions in wages are general in Belgium, according to the Times (London) Trade Supplement but the result is a growing dissatisfaction in the ranks of labor which, it is feared, may lead to serious consequences. Railway workers are said to threaten a general strike if proposed wage reductions are put into effect.

Latvian Railways Forsaking Standard Gage

At the present time there are some 500 miles of standard railways in Latvia, as against 1,125 miles of Russian gage (5 ft.), according to Trade Commissioner Groves, at Riga. The line from Riga to the Russian border on the line to Moscow is a broad gage line, while the road leading from the port of Libau is standard gage. The existing standard gage lines are being converted to the Russian gage as traffic demands.

Sabotage Hinted in French Accidents

The wrecking of several French trains recently has caused some inquiry into the probability of sabotage in view of the radical disaffection of many railway workers. In one instance a rail was found removed from the track. In another a fixed signal was bound with copper wires to show clear. Several serious accidents have resulted from this apparently malicious tampering with the signals and track.

German Consolidations

LONDON

A company called the Gutehoffnungshutte, has been formed in Germany by a group of German companies included in which are the Henschel Locomotive Works (Cassel), the Nuremburg Oil Engineering Works, the Deutsche Werft of Hamburg, a shipyard having 22 ways, various steel interests and Hamel & Leng of Dusseldorf, the latter having a dominating interest.

Further Service Curtailments in England

Due to the coal strike in England, great reductions in train service have been necessitated. The extent of these reductions had been predetermined by the officers and it is estimated that the present service is only about 66 per cent of normal. Sunday service on branch lines has been withdrawn in a number of instances, no collections or deliveries of mail are made on Sundays, and many regular through runs have been suspended temporarily. These economies have been estimated by the Engineer (London) to be sufficient to reduce the consumption of coal by the railways to 50 per cent of normal. It is pointed out that one of the conditions of service of the railway employees is the "guaranteed week" of regular employment. Owing to the curtailment of service this guaranty has now been reduced to three days per week.

Earnings of Nitrate Railways

The Nitrate Railways, the largest privately operated lines in Chile, earned a net of $1,218,776 (pounds to dollars at par) in 1920 as compared with $465,539 in 1919. Gross receipts were $5,345,708 in 1920 and $2,357,795 in 1919. Dividends of 7 per cent were paid on all the capital stock excepting the deferred ordinary shares and $488,090 was transferred to surplus. At the annual meeting of the stockholders in London on May 24, the acting chairman told of the adverse effect which labor troubles were having on earnings. There has, he said, been a great increase in expenses due to wage increases and payment for overtime. It was announced that the company is contemplating the electrification of its line from Iquique to Carpaz, 20 miles, and is seeking the sanction of the Chilean government for this work. The purpose of this undertaking would be to conserve water, which is scarce in northern Chile.

Equipment and Supplies

Locomotives

THE SHANTUNG RAILWAY has ordered from the American Locomotive Company through Mitsui & Co., New York, 1 Pacific type locomotive.

MITSUI & CO., New York, have ordered from the American Locomotive Company 5 Mogul type locomotives for the Imperial Karafuto Government, Japan.

Government Locomotives Sold

The Surplus Property Division of the War Department has sold 45 of the Decapod locomotives originally built for the Russian government to the Erie Railroad. This constitutes the remainder of the Decapods held by the government. The price has not been announced.

Freight Cars

THE BALTIMORE & OHIO is inquiring for 500 hopper car bodies, of 70-tons capacity.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is asking for prices on 500 composite gondola cars.

THE SPANISH GOVERNMENT RAILWAYS are asking for prices, through the car builders, on 100 freight cars.

THE BANGOR & AROOSTOOK is inquiring for 300 box cars, of 30-tons capacity and 200 flat cars, of 40-tons capacity.

THE CHESAPEAKE & OHIO is asking for prices for rebuilding from 500 to 1,000 composite cars, also for repairs to 500 to 1,500 steel cars.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has awarded a contract to the American Car & Foundry Company, for the repair of 500 box cars.

THE UNION PACIFIC has given an order to the Pacific Car & Foundry Company for repairs to 1,000 box cars. The work is to be carried out at the Portland plant of the Pacific Car & Foundry Company.

THE ERIE RAILROAD, reported in the *Railway Age*, of April 1, as asking for prices on repairs to 1,000 box cars of 40-tons capacity, will have these repairs made at the Hammond shops of the Standard Steel Car Company.

Iron and Steel

THE ALASKAN ENGINEERING COMMISSION has ordered 10,000 tons of rails and accessories from the Tennessee Coal, Iron & Railroad Company, to be rolled at the Ensley, Ala., mills.

Miscellaneous

NORFOLK & WESTERN.—Bids will be received until noon, June 22, at Roanoke, Va., for parts for electrical apparatus; 400 rods galvanized wire fencing; 24 steel flanged engine truck wheel tires; approximately, 45,861 lb. soft steel bars; 116,711 lb. steel plates, 580,302 lb. steel shapes, and repairs to electrical apparatus.

Signaling

THE BOSTON ELEVATED has ordered from the Union Switch & Signal Co. an a. c. electro-pneumatic interlocking for Forest Hills, the machine to have 13 levers for 41 signals and 16 automatic stops; 14 levers for 14 single switches and three double slips, and five traffic levers, making a total of 32 working levers in a 35-lever frame. At each high signal there will be an automatic stop. There will be section and sectional route locking throughout, and time locking on all signal levers.

Supply Trade News

The Standard Pressed Steel Company, has removed its headquarters from Philadelphia to Jenkintown, Pa.

P. R. Letts has been appointed office manager of the industrial bearings division of the **Hyatt Roller Bearing Company,** New York, succeeding **G. J. Traendly,** who is now office manager of the General Motors Corporation, New York.

C. W. Cross has been appointed railroad representative of the **Torchweld Equipment Company,** Fulton and Carpenter streets, Chicago. Mr. Cross was until June 1, manager of western railroad sales for the Chicago Pneumatic Tool Company.

John B. Seymour, district sales manager of the Verona Tool Works at Chicago, has been appointed sales manager of the **Superior Supply Company,** 5 South Wabash avenue, Chicago, effective June 16. The officers of this company, which was organized recently, are: President, **Will R. Sostheim,** formerly director and manager of the railroad, contractor and machinery department of Geo. B. Carpenter & Co.; vice-president, **E. A. Kreplin,** formerly purchasing agent of that company; and secretary-treasurer, **John H. Erby,** formerly Detroit district manager of the same company.

The name of **The Esterline Company,** Indianapolis, Ind., has been changed to **The Esterline-Angus Company.** The Esterline Company was organized by **J. W. Esterline** in 1900, and was incorporated in 1906. **D. J. Angus** became associated with Mr. Esterline in 1910 in a consulting engineering business, and in 1917 he became a stockholder and director of the Esterline Company. Mr. Angus has been responsible for the development of three new types of recording meters, known as the k. v. a. meter, the concentration meter and the graphic ohm-meter.

The directors of the **Greenfield Tap & Die Corporation,** Greenfield, Mass., on June 9, voted to purchase the entire capital stock of the Greenfield Machine Company, Greenfield, manufacturers of cylindrical and universal grinders, and the Morgan Grinder Company, Worcester, manufacturers of internal grinders. This combination together with the machines now produced by the Greenfield Tap & Die Corporation, will constitute the machine division of the Greenfield Tap & Die Corporation. The operation and organization of both plants will remain the same for the present, although eventually the Worcester plant will be moved to Greenfield.

Obituary

James Prentice Snedden, general superintendent at Bayonne, N. J., of the Babcock & Wilcox Company, New York, also vice-president of the Pittsburgh Seamless Tube Company, Beaver Falls, Pa., died on June 11, at the Johns Hopkins Hospital, Baltimore, Md., at the age of 58.

Trade Publications

BOILER EXPLOSIONS.—The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, has issued a new pamphlet setting forth some of the reasons for boiler explosions, attributable to staybolts. It also enumerates fifteen reasons why the danger of explosion is eliminated by the use of its staybolt.

FIRE TESTS OF BUILDING COLUMNS.—The United States Bureau of Standards, Washington, D. C., has issued Technological Paper No. 184 comprising a report of nearly 400 pages on tests of a great variety of building columns subjected to conditions simulating those of building fire while under load in order to determine the relative fire resistance of different constructions. These tests were conducted under the direction of S. H. Ingberg, physicist at the Underwriters Laboratories, Chicago, Ill., and resulted in the accumulation of a large amount of information that will be valuable to the building engineer.

Railway Construction

CHICAGO & EASTERN ILLINOIS.—This company contemplates the construction of a two-story brick railroad Y. M. C. A. building at Mitchell Yard, Ill., to cost $100,000.

CHICAGO, BURLINGTON & QUINCY.—This company has closed its bids for the grading in connection with the track elevation at Broadway, Benton and Clark streets, Aurora, Ill., the work to involve the expenditure of approximately $50,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company contemplates the construction of a new power plant at Trenton, Mo., on the site of its shops which were destroyed by fire.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for supplying the coal and sand handling equipment for a coaling station at El Reno, Okla. The station, which will replace a similar structure destroyed by fire, will be built by company forces.

CHICAGO UNION STATION.—This company contemplates widening Canal street, between Van Buren and Jackson streets, Chicago.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of May 6 (page 1093) as contemplating the construction of additions to its roundhouse at Waterloo, Ia., has awarded the contract for this work to W. J. Zitterall, Webster City, Ia. The company has also awarded a contract to M. J. Roach, Memphis, Tenn., for grading in connection with the construction of yard and storage tracks at Sarpy, La. The company contemplates the construction of an engine house at Herrin, Ill., to be built by company forces, and the enlargement of its pumping plant at Ramsey, Ill.

INTERNATIONAL & GREAT NORTHERN.—This company is erecting a new three-story office building with dimensions of 46 ft. by 52 ft., at San Antonio, Tex.

LOUISVILLE & NASHVILLE.—This company has awarded contracts to Joseph E. Nelson & Sons, Chicago, in connection with improvements to its terminal at Hazard, Ky., for the construction of a roundhouse, machine shop, oil storage building, car department building, storage and office building, lavatory building, and an engineers' locker and register building. The total cost of the project is approximately $180,000.

PITTSBURGH & WEST VIRGINIA.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a branch or spur from a point on its main line near Virginia Station, W. Va., a distance of approximately 3.2 miles.



Photo by Ewing Galloway

Railway Station at Lourenco Marques, Portuguese East Africa

Annual Report

New York, Chicago & St. Louis Railroad Company—Thirty-fourth Annual Report

To the Stockholders of The New York, Chicago and St. Louis Railroad Company:

The Board of Directors herewith submits its report for the year ended December 31, 1920, with statements showing the financial condition of the company.

The capital stock authorized and issued to December 31, 1920, was..... being the same as at the close of the previous year.		$30,000,000.00
The funded debt outstanding as of December 31, 1919, was..		$37,715,000.00
It was decreased during the calendar year:		
By the retirement of Equipment Trust Certificates of 1916.....	$110,000.00	
By the retirement of Engine Trust Certificates of 1916.....	30,000.00	
By the retirement of Equipment Trust Certificates of 1917.....	133,000.00	
By the retirement of First Mortgage Bonds	122,000.00	
		395,000.00
Funded debt outstanding as of December 31, 1920.....		$37,320,000.00

During the year, Second and Improvement Mortgage Bonds (Series A), with a par value of $1,036,000, were executed and delivered to the Treasury of the Company, the purpose of the issuance of these bonds being to reimburse the Treasury of the Company for capital expenditures theretofore made by it. These bonds have not been converted into cash.

The operation of your property under the direct supervision and control of the United States Government was continued until February 29, 1920. On March 1, 1920, the property was returned to the Company pursuant to the provisions of the Transportation Act, 1920.

The Company did not accept the guaranty provisions of that act. Therefore, your Company has no claim against the United States Government covering the so-called Guaranty Period. The earnings for the Guaranty Period exceeded one-half of the Certified Standard Return by approximately $890,000.00.

The compensation for the use of your property for the twenty-six months, during which it was operated by the United States Government, has not as yet been determined. Negotiations with the Railroad Administration are well under way, however, and an early settlement of all claims is expected.

SUMMARY OF OPERATIONS AFFECTING INCOME AND SURPLUS

Operating Income	Federal operations	Ten months ended Dec. 31	Total	Corporate income for the year
Railway operating revenues	$4,701,940.15	$23,953,608.15	$28,655,548.30	$23,953,823.96
Railway operating expenses	4,174,337.91	19,093,838.60	23,268,176.51	19,112,850.38
Net revenue from railway operations	$527,602.24	$4,859,769.55	$5,387,371.79	$4,840,973.58
Railway tax accruals	$619,978.93	$1,020,000.00	$1,639,978.93	$1,020,000.00
Uncollectible railway revenues	1,798.70	4,857.05	6,655.75	4,857.05
	$621,777.63	$1,024,857.05	$1,646,634.68	$1,024,857.05
Railway operating income	$94,175.39*	$3,834,912.50	$3,740,737.11	$3,816,116.53

*Deficit

Non-operating income				
Hire of freight cars—credit balance.	$159,843.17	.....	$159,843.17	.....
Rent from locomotives	33,900.06	$24,927.56	58,827.62	$24,927.56
Rent from passenger-train cars	3,568.45	11,602.50	15,170.95	11,602.50
Rent from work equipment	1,035.84	9,285.48	10,321.32	9,285.48
Joint facility rent income	28,461.71	72,143.10	100,604.81	72,143.10
Income from lease of road	.....	.....	.....	440,547.96
Miscellaneous rent income	.....	.....	.....	21,754.46
Miscellaneous non-operating physical property	.....	.....	.....	13,386.01
Income from unfunded securities and accounts	.....	.....	.....	95,493.41
Income from sinking and other reserve funds	.....	.....	.....	425.00
Miscellaneous income	.....	.....	.....	1,791.56
Total non-operating income	$226,809.23	$117,958.64	$344,767.87	$691,357.04
Gross income	$132,633.84	$3,952,871.14	$4,085,504.98	$4,507,473.57
Deductions from gross income				
Hire of freight cars—debit balance.	.....	$229,183.60	$229,183.60	$229,183.60
Rent for locomotives	$1,250.40	7,057.30	8,307.70	7,057.30
Rent for passenger-train cars	1,293.83	15,287.97	16,581.80	15,287.97
Total deductions from gross income	$45,981.10	$392,644.55	$438,625.65	$2,258,623.00
Net railway operating income	$86,652.74	$3,560,226.59	$3,646,879.33	.....
Net income	.....	.....	.....	$2,248,850.57

Disposition of net income	
First mortgage bonds redeemed (sinking fund)	$98,600.50
Dividend on first preferred stock, 5%	249,895.00
Dividend on second preferred stock, 5%	549,990.00
Dividend on common stock, 5%	699,480.00
Total sinking fund and dividend appropriations	$1,597,965.50
Surplus transferred to profit and loss	$650,885.07
Profit and loss, credit balance, December 31, 1919	$3,701,769.67†

Add:		
Surplus for the year, 1920	$650,885.07	
Discount on first mortgage bonds purchased and retired account sinking fund	23,399.50	
Discount on equipment trust certificates of 1917 purchased and retired	10,660.00	
Unrefundable overcharges	13,565.83	
Profit on road and equipment sold	3,801.29	
Miscellaneous credits, and adjustments	1,906,610.47	
Donations	665.90	
Delayed income credits	466,990.47	3,076,578.53
		$6,778,348.20
Deduct:		
Loss on retired road and equipment	135,423.13	
Surplus appropriated for investment in physical property	1,850,906.16	
Dividend appropriation of surplus	274,995.00	
Miscellaneous debits	8,372.31	
Delayed income debits	200,960.91	2,470,657.51
Profit and loss, credit balance, December 31, 1920		$4,307,690.69†

†Tentative, pending adjustments of claims, accounts, and other matters in dispute between the Company and the United States Government.

STATEMENT OF AMOUNTS DUE TO AND FROM THE U. S. RAILROAD ADMINISTRATION

	Due Railroad Administration	Due Company
Cash, December 31, 1917	.....	$1,292,167.80
Cash subsequent to December 31, 1917	.....	300,000.00
Agents and conductors balances, December 31, 1917	.....	1,190,497.76
Materials and supplies, December 31, 1917	.....	1,689,846.62
Equipment retired	.....	211,036.18
Assets, December 31, 1917, collected	.....	1,881,584.72
Depreciation on equipment	.....	1,026,729.81
Revenue prior to January 1, 1918	.....	346,241.01
Road property retired and not replaced	.....	43,031.01
Agents and conductors balances, February 29, 1920	.....	164,001.61
Federal liabilities paid	.....	5,606.87
Federal mileage scrip	.....	86.42
Compensation set up for the use of this Company's property during Federal Control (less advances of $3,249,000.00)		2,468,077.52
Corporate income transactions	$878,197.63	
Liabilities, December 31, 1917, paid	3,842,438.50	
Expense prior to January 1, 1918	2,140,548.74	
Additions and betterments (less paid on account, $712,000.00)	2,065,209.90	
Materials and supplies, February 29, 1920	1,922,826.44	
Federal assets collected	1,729.00	
Totals	$10,850,950.21	$10,618,907.33
Net balance due Railroad Administration	232,042.88	

The foregoing statement is informative only, inasmuch as the Company does not admit the propriety of the Railroad Administration charges.

The usual statistical tables are appended.

The Board desires to express its appreciation of the faithful and efficient services rendered by officers and employees during the year.

For the Board of Directors,
J. J. BERNET, President.

[Advertisement]

Railway Financial News

BOSTON & MAINE.—*Defers Dividend Action.*—Announcement that no action was taken by the board of directors at a meeting in Boston on June 14 in the matter of declaring a dividend on the first preferred stocks, which would normally be payable on July 1, was made by President J. H. Hustis. He pointed out that dividends on these stocks were cumulative and said they would be paid when earned.

In a statement issued after the meeting Mr. Hustis said:

The conditions which made it necessary to defer action on the preferred dividends due January 1 last have continued during the intervening months, and as a result it is estimated that the deficit for the first six months of 1921, after the payment of fixed charges and taxes, will be over $7,000,000.

This period was abnormal in many respects for all railroads, as is indicated in their monthly reports. With the Boston & Maine the sharp decline in business which began in November, 1920, has continued up to the present, without any substantial recovery. Wages have been at their maximum, and the fuel and materials used in this period were necessarily purchased or contracted for at the high prices of 1920. Maintenance both of track and equipment, which had been deferred because of conditions due to the war, was necessarily prosecuted to a greater extent than would ordinarily have been justified under the business conditions prevailing during the period.

We believe, however, that there is a turn in the adverse tide against which we have been struggling and that the second half of the year will show a different tendency. We have the Labor Board decision as to wages, which should result in a substantial saving. The Labor Board also has decreed the abrogation of national agreements on July 1, but as this question involves further consideration by the Labor Board in the event of failure to agree upon new agreements locally we cannot as yet estimate the effect of that decision.

We know that reduced prices of locomotive fuel should have a substantial effect on operating expenses in the second six months. A reduction of $1 a ton, which is conservative, would result in an annual saving on the present basis of consumption of approximately $1,500,000. We should also have the benefit of lower costs of other materials as fast as present stocks are replenished.

It is believed that any increase in business—and there are some indications of a slight revival—could be handled with a relatively small increase in expenses and should immediately be reflected in the net results.

CENTRAL VERMONT.—*Authorized to Pledge Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $100,000 of refunding mortgage 5 per cent gold bonds and to pledge them from time to time as collateral security for short term notes.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*Defers Dividend Action.*—Pending adjustment of accounts with the government, the directors have decided to defer until the September meeting the regular semi-annual dividends of 3½ per cent on the preferred and 2½ per cent on the common stock for the first half of the current year. This road is controlled by the Chicago & North Western.

COLUMBUS & GREENVILLE.—*Receivership.*—This road, formerly the Southern Railway in Mississippi, has been placed in the hands of a receiver by Federal Judge Edwin Holmes at Aberdeen, Miss., on the application of the company itself. The court has authorized the receiver, A. T. Stovall, to issue $200,000 receiver's certificates, of which about $150,000 will be used to pay delinquent taxes. The road runs from Columbus, Miss., westward to Greenville, 168 miles, with 110 miles of branch lines. The receivership was brought about to prevent the sale of the road for the taxes due.

DEATH VALLEY.—*Authorized to Issue Stock.*—This company has been authorized to issue and sell at par $34,900 of common capital stock, the proceeds to be used to retire 90 first mortgage bonds which mature on March 1.

DETROIT & IRONTON.—*Authorized to Issue Stock.*—This company has been authorized by the Interstate Commerce Commission to issue and sell at par $1,000,000 of capital stock, the proceeds to be used in the construction of a line approximately 15 miles long, extending southward from Springwells or Fordson, Mich., to a connection with the Detroit, Toledo & Ironton, near Trenton or Flat Rock. The company has also asked authority to assume as lessee of the properties of the Detroit, Toledo & Ironton obligations in respect of certain securities issued by the latter company. These matters were reserved by the commission for further consideration.

DETROIT, TOLEDO & IRONTON.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue and sell at par $182,000 of first mortgage bonds.

KANSAS CITY TERMINAL.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission to issue and sell at not less than 93½ per cent of par and accrued interest or to exchange for maturing notes $2,000,000 of 10 year, 6½ per cent, secured gold notes and to pledge as collateral security for the notes $3,125,000 first mortgage 4 per cent gold bonds.

E. H. Rollins & Sons, of New York, and the Continental and Commercial Trust & Savings Bank of Chicago are offering these notes, dated July 1, 1921, at 96.44 and interest to yield 7 per cent. The proceeds will be used, with other funds, to retire $2,500,000 of the company's notes, maturing July 1. The twelve railroads entering Kansas City are bound unconditionally to provide funds for the payment of principal and interest of the pledged bonds and taxes, as well as their ratable share of operating expenses.

MAHONING COAL RAILROAD.—*Extra Dividend Declared.*—This company has declared an extra dividend of $15 a share on the common stock and the regular semi-annual dividends of $5 on the common and 2½ per cent on the preferred. The extra dividend on the common is payable July 1 to stock of record June 24; the regular common August 1 to stock of record July 15, and the preferred dividend is payable July 1 to stock of record June 24. The dividends of this company from 1915-1920 have been at a rate of 20 per cent a year.

READING COMPANY.—*Trustees Appointed.*—The trustees appointed under the segregation plan by the United States District Court at Philadelphia for the stock of the Philadelphia & Reading Coal & Iron Company, which will be assigned to the new corporation are: Newton H. Fairbanks, of Springfield, O., and Joseph B. McCall, of Philadelphia, Pa. The trustees of the New Jersey Central stock owned by the Reading company are R. E. McCarty, of Pittsburgh, general manager of the Pennsylvania System, Central Region, and C. S. W. Packard, of Philadelphia.

A decree filed by Judges Buffington, Davis and Thompson, making the appointment, provides that the two groups of trustees shall diligently take up their duties and in case either of the trustees are unable to agree as to the voting of shares or any other matter in the scope of their duties they may apply to the court for instruction.

SALT LAKE & UTAH.—*Application for Loan.*—This company has applied to the Interstate Commerce Commission for a loan of $700,000 from the revolving fund for 15 years.

ST. LOUIS-SAN FRANCISCO.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to sell $4,232,000 of prior lien mortgage bonds at not less than 90 and to pledge them as security for short term notes.

TENNESSEE CENTRAL.—*Nashville Terminal Company Declares Lease Forfeited.*—The Nashville Terminal Company which is leased to the Tennessee Central at an annual rental of $60,000 has refused to accept $30,750, being the rental due to January 1, 1921, with interest, and has posted notices to the effect that it has taken possession of the property covered by the lease. The company declares that the lease has been forfeited owing to the failure of the Tennessee Central to pay the rental when due.

Judge E. T. Sanford at Knoxville, Tenn., has postponed until June 25, the hearing on the lease controversy. J. H. DeWitt, of Nashville, has been appointed special master to make a report to the court showing an itemized list of all creditors to whom the receivers are indebted and when and for what each debt was created.

VIRGINIAN.—*Annual Report.*—The corporate income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919
Railway Operating Revenues, March 1 to December 31, 1920:		
Freight	$13,901,140	.....
Passenger, including excess baggage and club car fare	798,531	.....
Total operating revenues (inc. other)	$15,989,750	.....

Railway Operating Expenses, March 1 to December 31, 1920:		
Maintenance of way and structures	$1,965,229	.....
Maintenance of equipment	3,177,424	.....
Traffic	91,735	.....
Transportation	5,518,806	.....
General	350,688	.....
Total operating expenses (inc. other)	$11,085,299	.....
Net revenue from railway operations	$4,904,451	.....
Railway tax accruals	1,026,492	.....
Total deductions	$1,026,507	.....
Total railway operating income	$632,786	.....
Tentative net railway operating income for the ten months ended December 31, 1920	$4,510,729	.....
Compensation due from U. S. Government (January and February, 1920; full year 1919)	513,365	$3,247,603
Tentative railway operating income for the year subject to settlement with the United States Government	$5,024,095	.....
Total non-operating income	$284,209	.....
Gross income	$5,308,304	$3,548,577
Total deductions from gross income	2,020,842	1,767,012
Net income (tentative for year 1920 subject to settlement with U. S. Government)	$3,287,462	$1,845,632

The annual report of the Virginian will be reviewed editorially in an early issue.

WICHITA NORTHWESTERN.—*Loan from Revolving Fund Approved.*—The Interstate Commerce Commission has approved a loan to this company of $381,750 for 10 years to be used in meeting maturing indebtedness and in paying for some additions and betterments.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts: Port Bolivar Iron Ore Railway, $35,000; Chicago, Milwaukee & Gary, $200,000; Bangor & Aroostook, $575,000. The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments on account of the six months' guaranty for 1920 as follows:

Bath & Hammondsport	$9,000
Central New York Southern	6,000
Chicago, Detroit & Canada	55,000
Fort Worth Belt	12,500
Galveston Wharf	100,000
Penn Yan & Lake Shore	2,000
Toledo & Ohio Central	105,000
Ulster & Delaware	25,000
Lake Erie & Western	360,000
Chicago & Alton	20,000

The commission has also issued a certificate for the final amount due under the guaranty to the Electric Short Line for $14,993.67.

Dividends Declared

Albany & Susquehanna.—$4.50, semi-annually, payable July 1 to holders of record June 15.

Chicago & North Western.—Common, 2½ per cent, semi-annually; preferred, 3½ per cent, semi-annually; both payable July 15 to holders of record June 23.

Chicago, Indianapolis & Louisville.—Preferred, 2 per cent, semi-annually, payable June 29 to holders of record June 22.

Detroit, Hillsdale & South Western.—2 per cent, payable July 5 to holders of record June 21.

Kanawha & Michigan.—1¼ per cent, quarterly, payable June 30 to holders of record June 20.

Little Schuylkill Navigation Railroad & Coal Company.—$1.00, payable July 15 to holders of record June 21.

Mahoning Coal Railroad.—Common, $5.00, semi-annually, payable August 1 to holders of record July 15; common, extra, $15, payable July 1 to holders of record June 24; preferred, 2½ per cent, semi-annually, payable July 1 to holders of record June 24.

Northern Central.—4 per cent, semi-annually, payable July 15 to holders of record June 30.

Pittsburgh, Ft. Wayne & Chicago.—Preferred, 1¾ per cent, quarterly, payable July 5 to holders of record June 10; common, 1¾ per cent, quarterly, payable July 1 to holders of record June 10.

Rensselaer & Saratoga.—4 per cent, payable July 1 to holders of record June 15.

Railway Officers

Executive

V. V. Boatner, whose election as president of the Peoria & Pekin Union, with headquarters at Peoria, Ill., was announced in the *Railway Age* of June 10 (page 1378), was born at Bethlehem, Miss., on May 6, 1881. He was educated at the Mississippi College at Clinton, and entered railroad service in May, 1901, as a station helper on the Illinois Central at Elizabeth, Miss. His entire railway career has been spent in the service of that company. On August 8, 1901, he was transferred to the office of the trainmaster at Greenville, Miss., as timekeeper and stenographer. In March of the following year he was transferred to Wilson, La., where he served successively as clerk in the trainmaster's office, copy operator, train dispatcher and chief dispatcher. He was promoted to trainmaster on April 1, 1907, and served in that capacity on the New Orleans, Vicksburg, Memphis and Indiana divisions until July 15, 1916, when he was promoted to superintendent, with headquarters at Vicksburg, Miss. At the time of his recent election Mr. Boatner was serving as superintendent of the Memphis division, to which he had been transferred in August, 1917.



V. V. Boatner

Elliott E. Nash, whose election as vice-president and general manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., was announced in the *Railway Age* of June 10 (page 1378), was born at Hudson, Wis., on March 28, 1870, and entered railroad service in June, 1886, with the Chicago, St. Paul, Minneapolis & Omaha. He was employed by this company on part time work until June, 1888, when he became a clerk in the local station at Hudson, Wis. Six months later he was transferred to St. Paul, Minn., as a clerk in the auditor's office, and served in that position until November, 1891, when he was promoted to traveling auditor, with the same headquarters. In March, 1892, Mr. Nash was made agent at Ashland, Wis., and served there until November, 1898, when he returned to St. Paul as agent. In March of the following year, he was transferred to Minneapolis, where he served until January, 1905. On this latter date he was promoted to assistant superintendent, with headquarters at Itasca, Wis., and in May of the same year he was transferred to Eau Claire, Wis. In May, 1910, Mr. Nash was assigned to special work in



E. E. Nash

the office of the president of the Chicago & North Western at Chicago, and in May, 1911, he was promoted to superintendent of the Minnesota division of the North Western, with headquarters at Winona, Minn. In April, 1912, he was transferred to the Madison division, with headquarters at Baraboo, Wis. In November, 1913, he was promoted to assistant general superintendent, lines east of the Missouri river (except the Iowa, Minnesota and Dakota divisions), with headquarters at Chicago. He was transferred to the Iowa territory as assistant general superintendent with headquarters at Boone, Iowa, in October, 1917. During the period of federal control, Mr. Nash served as assistant to the federal manager of the North Western, with headquarters at Chicago. He was appointed general manager of the Minneapolis & St. Louis in March, 1920, and was serving in this position at the time of his recent election.

Financial, Legal and Accounting

C. L. Young, district claim agent of the Chicago & North Western, with headquarters at Milwaukee, Wis., has been promoted to assistant general claim agent, with headquarters at Chicago, succeeding F. B. Piersol, deceased. **O. J. Adams** succeeds Mr. Young.

George N. Yard, whose election as secretary and treasurer of the Gulf, Colorado & Santa Fe, with headquarters at Galveston, Tex., was announced in the *Railway Age* of June 3 (page 1301), was born at Harrisburg, Tex., on September 17, 1863. He was educated in the state normal school at Trenton, N. J., and entered railway service in 1884 on the Texas lines of the Southern Pacific. He has been in the service of the Gulf lines of the Santa Fe continuously for 32 years, having entered the employment of that company in July, 1889, as a clerk in the treasury department. He was made assistant cashier and paymaster in 1890, and in August, 1897, was promoted to paymaster. He was serving in that position at the time of his recent election.

Operating

Edgar G. Goforth, whose promotion to general manager of the International & Great Northern, with headquarters at Palestine, Tex., was announced in the *Railway Age* of May 13 (page 1149), was born at Goforth, Tex., on December 10, 1886. He entered railway service on May 1, 1902, as a station helper on the Missouri, Kansas & Texas. After serving for two years as telegraph operator and relief agent on this road, he entered the service of the International & Great Northern, as a telegraph operator and towerman. In April, 1905, he was promoted to train dispatcher and three years later was appointed a chief train dispatcher. In December, 1912, he was made trainmaster, a position which he held for five years, and which was followed, in February, 1917, by his promotion to superintendent. At the time of his recent promotion, Mr. Goforth was serving as assistant general manager, with headquarters at Palestine, Tex., a position to which he had been promoted in June, 1919.



E. G. Goforth

F. G. Gurley, assistant superintendent of the Chicago, Burlington & Quincy, with headquarters at Wymore, Neb., has been promoted to superintendent, with headquarters at Alliance, Neb. He succeeds **G. L. Griggs,** who has been transferred to the Beardstown division, with headquarters at Beardstown, Ill., succeeding **W. A. Chittenden,** who has been transferred to Brookfield, Mo. Mr. Chittenden succeeds **N. H. Young,** who has been transferred to St. Louis, Mo. **H. J. Hoglund** has been appointed trainmaster, with headquarters at Wymore, Neb. The promotions and appointments were effective June 16.

Traffic

L. H. Mann has been appointed general agent of the Erie, with headquarters at Indianapolis, Ind., succeeding C. A. Rouse, who has resigned.

H. C. Dinkins has been appointed general agent of the International & Great Northern, with headquarters at Mexico City, Mex., effective June 15.

H. E. Macdonell, assistant freight traffic manager of the Canadian Pacific with headquarters at Montreal, has been granted a leave of absence on account of illness, effective June 6. During his absence **R. E. Larmour** will serve as acting assistant freight traffic manager, **C. E. Jefferson** as acting general freight agent and **S. C. Hurkett** as acting assistant general freight agent.

Obituary

Henry R. Williams, former vice-president of the Chicago, Milwaukee & St. Paul, died at Seattle, Wash., on June 8. Mr. Williams was born at Palmyra, Wis., on July 14, 1849, and entered railroad service in January, 1867, as a telegraph operator on the Chicago, Milwaukee & St. Paul. After serving for four years in this capacity on various points on the line, he was made assistant train dispatcher at Milwaukee, Wis., where he remained until 1873. In this year, he was made train dispatcher, with headquarters at Minneapolis, Minn., and during the succeeding eight years served in this position on the Hastings, Dakota and River divisions. In 1881, he was promoted to trainmaster on the Hastings and Dakota division, and later was transferred to the Iowa and Minnesota division. On January 1, 1882, he was promoted to superintendent, serving on the Iowa and Minnesota division until September 1, 1885, when he was trasnferred to the southern Minnesota division, with headquarters at La Crosse, Wis. From February, 1888 to June, 1890, he served as superintendent of the Ottumwa & Kansas City line, with headquarters at Kansas City and Chillicothe, Mo. In the latter year, he was promoted to assistant general superintendent, with jurisdiction over the Northern district of that road, and eight years later was promoted to general superintendent. He served as general manager from February 1, 1900 until October, 1905, when he was elected president of the Pacific road, which had been incorporated to build the Washington section of the Chicago, Milwaukee & St. Paul's extension to the Pacific coast. On January 4, 1909, Mr. Williams was elected president of the Chicago, Milwaukee & Puget Sound, a position which he held until January 1, 1913, when he was elected vice-president of the Chicago, Milwaukee & St. Paul. He served as vice-president of the St. Paul from that time until February, 1918, when he retired from active railroad service.



H. R. Williams